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Great
Exhibition of the Works of Industry of All Nations,
1851.

REPORTS

BY

T H E J U R I E S

ON

THE SUBJECTS IN THE THIRTY CLASSES INTO WHICH
THE EXHIBITION WAS DIVIDED.

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CLASS XV.

REPORT ON MIXED FABRICS, INCLUDING SHAWLS, BUT
EXCLUSIVE OF WORSTED GOODS.*Jury.*

CHARLES VAN HOGGAERDEN, *Chairman*, Belgium; Merchant, Member of Chamber of Commerce, Brussels.

JOHN R. LAVANCHY, *Deputy Chairman*, 6 New Burlington Street; Silk Mercer.

W. CLABBURN, Norwich; Manufacturer.

MAXIME GAUSSEN, France; Member of the Central Jury.

DAVID KEMP, Glasgow; Shawl Merchant.

N. KINGSBURY, United States; Manufacturer.

JOHN MORGAN, Grenlaw, Paisley; Manufacturer.

WILLIAM PRINSEP, *Reporter*, 30 Gloucester Gardens.

TITUS SALT, J. P., Bradford; Manufacturer.

FREDERICK SCHWANN, Huddersfield; Merchant.

JOHN H. SWIFT, United States; Merchant.

Sir GARDNER WILKINSON, Turkey.

Associates.

F. BERNOVILLE, France; Spinner and Manufacturer. (*Juror in Class XX.*)

GEORGE HARRIS, 31 Milk Street, City; Shawl Manufacturer.

A.—MIXED WOVEN FABRICS, OF VARIOUS MATERIALS, SHOT WITH EITHER COTTON,
LINEN, WOOL, SILK, MOHAIR, OR OTHER SUBSTANCES.

THE description given in the "Classification for the use of Juries" of the articles to come under the examination of this Class is so very miscellaneous, namely, "for dresses, damasks, aprons, shoe and boot cloths, linings, cravats, vestings, ponchos, pantaloons cloths, coatings, tweeds, quiltings, plaids, tabinets, poplins, paramattas, chalis, barèges, cashmeres, articles for furniture, shawls," that some necessity was found for drawing a line more definitely between this and Class XII., where, under the head of "Woollen and Worsted," many of the above articles would be better placed.

We have consequently confined our notice to the following articles:—Vestings, coatings, tweeds, linings, pantaloons stuffs, shoe and boot cloths, cravatings, plaids, tabinets, poplins, paramattas, cashmerets, cassinets, chalis, barèges, cashmeres, shawl cloths, and Utrecht velvets.

General Remarks.

It is difficult to give a correct idea of the origin of many of these fabrics. Varieties of them have been made in Yorkshire, Gloucestershire, and Norfolk,

from time immemorial, and are of equally ancient date in many parts of Europe. The introduction of spun silk with wool may be dated from 1685, when the revocation of the Edict of Nantes brought over to Spitalfields and to Norwich especially nearly 30,000 artisans from Paris and Lyons, who established these manufactures in England. We find that the importations of silk into Ireland in that year were of 80,000*l.* value. Tabinets or poplins have been produced in Ireland ever since 1771. Novelties are being constantly introduced, both in style and texture, as well as in new combinations of materials, and many most valuable experiments of this character have been adopted, particularly within the last ten years. We may notice two articles in particular, which have become of great importance to this class of manufactures, viz., alpaca and mohair. The former is the wool or hair of an animal of the llama tribe from the region of Peru; the latter, that of a goat peculiar to Asia Minor: and some idea of the rapid development of such novelties may be formed from the following returns of imports, viz.—Of alpaca wool, from 1836 to 1840, 7,000 bales per annum; from 1841 to 1845, 13,000 bales per annum; from 1846 to 1850, 20,000 bales per annum. Of mohair, in 1841, 5,621 bales; in 1850, 12,884 bales.

We believe that to England must be accorded the chief credit of searching for and adopting most of the new and important materials which are every year being introduced into these manufactures, tending naturally to increase the value of the trade: she also takes the lead in the quantity of production. France, ever ready to adopt and improve, produces very largely the same articles, and is peculiarly successful in the finer and richer descriptions, where delicacy of design and colour is most favourably applied; and had she equal facility with England in sending her productions into foreign markets, the development of her medium classes of these goods would have been more complete. Austria has made very great progress within the last ten years in these fabrics; her materials are excellent, and ably put together; and she presents them at low price, for a large internal consumption. Bohemia, in particular, supplies tissues of a quality that bears the stamp of decided progress. Labour in these countries is extremely cheap, and the artisans are intelligent, and if the progress now apparent continues with increased energy for the coming ten years, their productions may vie, particularly in price, with those of all Europe; but we find no originality among them, whether of design or manufacture. Prussia and the States of the Zollverein have given valuable proofs of their powers of copying the productions of France and England. They require but the support of capital, and the encouragement of a natural taste for design, to become the producers of the best articles at low prices; for in many cases they have the raw material at hand, and they are not wanting in either energy or ingenuity to give the fullest development to such advantages. In Belgium we find proofs of a very active commerce in these fabrics, and an increasing desire to take advantage of the demand for exportation of middling and low-priced goods. The ancient excellence of the weavers of that country has not, apparently, prompted the manufacturers to keep the lead in textile fabrics, either in character or quality. Their produce is very extensive, both for the home and foreign demand, and they appear to prefer leading purchasers to their stores by cheapness and goodness of manufacture, rather than by the attraction of superior excellence or novelty. Portugal has exhibited some

good copies of French and English fabrics, which give fair promise of excellence. Egypt has contributed some specimens of its early essays in these fabrics; but as they are chiefly the produce of artisans of other countries, they should only be noticed as evidence of her desire to promote the industry of her population in working upon the raw materials at her command.

The peculiar feature of this manufacture is, that in most descriptions the hand-loom alone is made use of, giving employment to a vast number of persons, we may perhaps say millions; who are thus, by the various occupations connected with it, placed entirely above want.

Particular Remarks.

Exhibitors of various articles are in number as follows:—

From England	-	-	-	-	30
Scotland	-	-	-	-	3
Ireland	-	-	-	-	6
France	-	-	-	-	11
Zollverein States	-	-	-	-	38
Austria	-	-	-	-	16
Belgium	-	-	-	-	13
Holland	-	-	-	-	1
Portugal	-	-	-	-	2
Switzerland	-	-	-	-	2

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Among whom we proceed to notice those who are most worthy of remark.

SCHWANN, F., Huddersfield (No. 115, Class XV., p. 76). All his assortment of embroidered cashmeres and other descriptions are of perfect character, particularly the valentias. The designs are rich, and in good taste; and the execution such as to create regret that the names of the artisans are not recorded.

This contributor being a member of the Jury of this Class, his goods are not under consideration in competition for the reward of merit.

The Jury award Prize Medals to the following Exhibitors in this department:—

ATKINSON, R., and Co., 30 College Green, Dublin (No. 256, Class XV., p. 79), for poplins of excellent quality, rich in colour, and perfect in manipulation. There are some double and triple corded, of admirable execution. The figured pieces are of good design and brilliant effect. The specimen given of their weaving, by the presence of one of their weavers, who works at an elegant loom upon a rich and elaborate design, is highly interesting and instructive.

BOLINGBROKE, C. and F., Norwich (No. 311, Class XV. p. 80), for poplins, plain striped, watered, of superior make, and excellent colours; the character of their manufacture is highly meritorious.

BROWN and FORSTER, 5 Vigo Street, Regent Street, London (No. 9, Class XV., p. 74), for a variety of superior vestings, of cotton warp and weft of wool, worked by Jacquard, in designs of excellent taste; likewise stuffs of other descriptions. Their waistcoatings of plush vagonia will be found remarkable for novelty and excellence, and as being well adapted for a large consumption.

CATTEAUX BROTHERS, Brussels (No. 244, Belgium, p. 210), for pantaloon stuffs of cotton-wool and linen with cotton. They are fabrics of good taste and extensive consumption, and highly deserving of merit for cheapness.

CATTEAUX-GAUQUË, Courtray (No. 245, Belgium, p. 210), for fabrics of the same description, but chiefly calculated for the lower classes. A Prize Medal is awarded for goodness of texture and cheapness.

CORMALDI, D., Vienna (not in the Catalogue), presents specimens of vestings of spun silk and wool, also in fine Saxon wool, figured on the Jacquard. There are some with corners embroidered on a new principle. These goods are of decided merit.

CROCO, F., 163 Rue de Charonne, Paris (No. 809, France, p. 222), for vestings, distinguished for the purity and elegance of their design, and for fineness of execution, particularly in the cashmere descriptions, attention being apparently more given to quality than to cheapness of price: his goods are of high merit.

DAY, JOHN, and SOX, Mold Green, Huddersfield (No. 113, Class XV., p. 76), for a pantaloon stuff, warp of cotton with a weft of carded wool, crossed on one side only, of the character of cassinett. The surface of this stuff is soft to the touch, without having been sheared. This fabric is remarkable for excellence and equality of tints, difficult to accomplish.

ECHINGER BROTHERS, Vienna (No. 304, Austria, p. 198), for vestings of a strong and useful character made with cotton, wool, and silk, of moderate price, worth about 4s. per yard; some with combination of colours.

FASSIN, —, jun., Rheims (France), for a variety of excellent goods of a similar description, destined for home consumption, and got up with good taste, chiefly waistcoatings of cotton warp shot with wool and silk, also with combed wool, such as cashmere and valentias, figured with spun silk, of good design and quality. These examples are of great merit, both in execution and lowness of price.

FUNK, R., Gladbach (No. 587, Prussia, p. 266), for a variety of superior fabrics, well coloured and of excellent materials, in several combinations of cotton, wool, and silk, for summer cloths and dresses, such as the Victoria cloths and cassinets, which deserve particular notice.

GRAFE and NEVIANDT (No. 591, Prussia, p. 266), for vestings, made on the Jacquard loom, of cotton warp, shot with wool, and figured in various styles; they are of superior merit.

HAAS, PHILIPP, and SONS, Vienna (No. 259, Austria, p. 197), for woollen velvet shot with cotton, of superior quality, soft in texture, and strong. Medal awarded in Class XII.

HEYMANN, CHARLES, and Co., Crefeld (No. 575, Prussia, p. 266), for vestings chiefly made on harness looms, of the character of poplin, corded with cotton in weft. Some worked with gold thread have a rich effect at a moderate price, averaging not more than 3s. 7d. Their productions are of decided merit.

KAUFFMANN, H., Berlin (No. 117, Prussia, p. 255), for specimens of woollen velvets, of plushes of goats' hair of various descriptions, printed, and chiné, and all of high merit, fully deserving the award.

LEABOYD, JAMES, Huddersfield (No. 115, Class XV., p. 76), for cassinets of a very superior quality, exhibited along with the goods of Mr. Schwann: although his name does not appear as an exhibitor, he is entitled to the full credit of excellence.

LEABOYD, W., Huddersfield (No. 115, Class XV., p. 76), for cassinetts of a superior quality and novel make, presenting different faces of satin and cloth, where the difference of tint in dyeing is not perceptible; and other fabrics of superior merit. This manufacturer has exhibited his specimens with those of Mr. Schwann.

LEFEBVRE-DUCATTEAU BROTHERS, Roubaix (No. 1309, France, p. 243), for vestings of excellent quality, and although chiefly prepared for the middle classes, distinguished for good design and make. We noticed particularly a waistcoating of cotton warp, with weft of combed wool, checked with silk. Also some valentias, figured with silk of admirable design and fabric. Their tasteful and varied cheap goods are prepared for a very large consumption.

LEMAIRE, DESCAMPS, and PLESSART, Tournay (No. 240, Belgium, p. 210), for specimens of pantaloons stuff of linen warp and weft of satiné. Those at the price of 6½d. are extraordinarily cheap.

LIESART-CHAFFAUX, Madame, Tournay (No. 242, Belgium, p. 210), for specimens of pantaloons stuff of linen warp, and weft of cotton satiné well manufactured, and at the low price of 7d. to 8d. per yard.

MARK and WEIGERT, Berlin (No. 113, Prussia, p. 255), for excellence of manufacture in Utrecht velvet.

MILNER and HALE, Huddersfield (not in the Catalogue), for excellent cashmerettes of the kind called kerseymere, warp of cotton and weft of wool (carded merino). This stuff is milled and worked with a fluff, and is remarkable for its softness and perfection. The tints of both cotton and wool are so perfectly equalised as to be scarcely distinguishable. There is another kerseymere, warp of organzine silk and weft of carded wool, equally well blended in colours, of which the feel and quality are admirable. Their merit is undoubted.

MORGENROTH and KRUGMANN, Elberfeld (No. 532, Prussia, p. 265), for woollen velvet, plain and figured, of a quality of distinguished merit.

MURLEY, W. J. C., Bow Churchyard, London (No. 10, Class XV., p. 74), for vestings of the character of velvet with goats' hair and cotton; cotton warp with silk weft. These are of superior character; but their vestings of linen thread and silk are truly remarkable. Their embroidered waistcoatings by the "*battant brocheur*," merit particular attention for excellence of workmanship. This house presents articles of high merit.

PATRIAU, CHARLES, Rheims (No. 1380, France, p. 245), for great variety and excellent taste in their vestings of cashmere, with cotton warp and weft of silk and wool; those also of woollen plush, plain and figured, are particularly deserving of notice. The poplin vestings are likewise of distinguished perfection. This house has produced at Rheims a new fabric called *piqué*. They employ a great number of artisans, and supply largely for exportation showy and cheap goods as well as those of superior qualities, which are eagerly demanded for home consumption. The superior and pre-eminent character of their manufactures entitles them to the very highest consideration, and in the opinion of the Jury they fully deserved the award of the Council Medal; but this was not confirmed by the Council of Chairmen.

PIERDMENGES and KLEINJUNG, Vierzehn (No. 573, Prussia, p. 266), for an excellent description of vestings of cotton warp, with weft of carded and combed wool, worked with silk checks, of varied and good designs.

PIM BROTHERS and Co., Dublin (No. 255, Class XV., p. 79), for excellent specimens of poplins got up with great carefulness and evenness of make. There are some on the Jacquard, figured of single colour, worthy of particular notice, and one especially woven with four colours highly deserving of merit for perfection of make and design.

ROCKSTROH, H., Vienna (No. 306, Austria, p. 198), for good specimens of waist-coatings of cotton and wool, with the corners of the waistcoats figured by the Jacquard. They are sold at the low price of 1s. 7d., and, in this respect, the merit of the exhibitor entitles him to reward.

STIEFF and HARRASS, Potsdam (No. 161, Prussia, p. 256), for a variety of superior vestings of silk warp and cotton weft, figured with silk, by the Jacquard loom, with good effect, at very moderate prices. They also show two pictures of Jacquard imitations of engravings. Their productions are of high merit.

TAYLOR, J., and SON, Newsome, Huddersfield (No. 111, Class XV., p. 76), for vestings of great variety and superior make. The cashmeres are of good taste and high merit. There is among them a novelty of good invention, being a variegated cloth of cotton warp, figured and shot with goats' hair, styled Tigré. The fabrics of this house are of the highest merit, and in the opinion of the Jury entitled to the award of a Council Medal; but this was not confirmed by the Council of Chairmen.

TEE and SON, Barnsley (No. 37, Class XIV., p. 86), for a variety of fabrics of excellent quality, distinguished both for design and economy: they present a novelty peculiarly worthy of merit, being the introduction of a new material called China grass, a substance which has lately been spun by Messrs. Marshall, of Leeds. The employment of this new thread in vestings and pantaloons cloths gives a peculiar finish to these goods.

TOLSON and SONS, Dalton, Huddersfield (No. 116, Class XV., p. 76), for an excellent assortment of vestings and other articles of superior quality, among which we particularly distinguish some Scotch designs, with silk and wool, brilliant and cheap. There is also a lady's cloth, lightly dressed, of particular merit. Their fabrics generally are of high merit. Medal awarded in Class XII.

WALMESLEY, H., Failsworth, near Manchester (No. 51, Class XI., p. 74), for poplins of a new and cheap description, with several other fabrics of excellent character, showing great ingenuity.

WEIGLE, J. J., Ludwigsburg (No. 29, Wurtemberg), for a fabric of vestings of cotton, carded wool, plain, and crossed with silk, an excellent description of valentia well manufactured. Medal awarded in Class XI.

The Jury make Honourable Mention of the following Exhibitors:—

ANED, T., and SONS, Halifax (No. 137, Class XV., p. 77), for pantaloons cloths of cotton and goats' hair, and light coatings, very well manufactured and of very good colours.

BACHOVEN and VOLLSCWITZ, Zerbst (No. 830, Prussia, p. 272), for silk and cotton plush, highly esteemed for the linings of caskets. (Awarded in Class XIII.)

BARBOZA, J. (No. 682, Portugal, p. 293), for excellent fabrics for pantaloons, of good manufacture, strong, and giving great promise of equality with the productions of other countries.

BENNETT and Co., Abingdon Street, Manchester (No. 185, Class XV., p. 78), for specimens of Utrecht velvet. One design in relief, made in the Jacquard loom, is well worthy of notice; more, however, for the happy idea than for the excellence of its execution. Credit is due to them for the introduction of the article.

BONTE, L., Roubaix (No. 33, France, p. 220), for pantaloon stuffs of cotton warp, shot with wool, of well-chosen colours and good materials, at prices suited to the working classes.

BULL and WILSON, London and Bradford (No. 12, Class XV., p. 74), for waistcoatings of wool called buckskins, being a kerseymere of very fine texture, embroidered with silk by children of twelve years of age. The work is of remarkable beauty, particularly in its character.

BURKHARDT, H. T., Crimmitschau (No. 109, Saxony), for light cloths, cassinettes, the qualities and colours of which are good.

COCU, A., 58 Faubourg du Temple, Paris (No. 125, France, p. 222), for vestings of cashmere design, of good quality, and well-assorted colours for general consumption.

DAUFRIAS and Co. (No. 853, Portugal, p. 293), for most creditable goods of various kinds. We noticed waistcoatings in the Scotch style, made of wool, cotton, and silk. (Honourable Mention awarded in Class XIX.)

FRY, W., and Co., Dublin (No. 267, Class XV., p. 80), for furniture pieces, manufactured in a superior manner; also for some fair specimens of dress pieces plain and figured.

GILSON and BOSSUT, Tournay (No. 241, Belgium, p. 210), for specimens of pantaloon stuffs of linen warp, strong, useful, and cheap.

HESSE, G., 6 Rue de la Villière, Paris (No. 263, France, p. 225), for vestings of considerable excellence in manufacture.

LEHMANN, D. J., Berlin (No. 136, Prussia, p. 256), for specimens of plush and woollen velvets, plain and printed. We also noticed some in two colours made on the Jacquard, after French designs. The manufacture is good and the colours well chosen.

LEVIN, H., SONS, Berlin (No. 114, Prussia, p. 255), for vestings of a similar description, also worked with wool and silk on the Jacquard. Their goods are of excellent character.

MAX MEYER, and Co., Berlin (No. 133, Prussia, p. 256), for silk and cotton plush, of excellent quality.

PFERDMENGES BROTHERS, Gladbach (No. 574, Prussia, p. 266), for light cloths, called cassinettes, with cotton warp and carded wool weft. The manufacture is good and price moderate.

REPIQUET and SILVENT, Lyon (No. 1432, France, p. 246), for goods almost entirely composed of silk, and perhaps belonging to Class XIII., but we find some waistcoatings of silk velvet shot with cotton, and some poplins of good quality; the waistcoats being in particularly good taste. (Prize Medal in Class XIII.)

REYNOLDS, W., 81 Grafton-street, Dublin (No. 266, Class XV., p. 79), for poplins for furniture, manufactured in a superior manner.

RURMANN and MECKEL, Elberfeld (No. 580, Prussia, p. 266), for vestings 'dis-

tinguished for their moderate cost. Cotton warp shot with silk and cotton made on the Jacquard, some of poplin and satined descriptions.

SCHOFIELD, J., Rastrick, Huddersfield (No. 125, Class XV., p. 76), for pantaloons cloths, vestings in wool, silk and cotton, and kerseymeres called "patent Britannics," all of good quality.

SHULTE, J. H., Barmen (No. 675, Prussia, p. 268), for valentias and cashmere designs of good manufacture.

TRENDEL, jun. (No. 41, Bavaria), for specimens of light pantaloons stuffs of cotton and wool, of excellent make, good taste, and moderate price.

WILLETT, E., NEPHEW, and Co., Norwich (No. 310, Class XV., p. 80), for paramattas and bombazines of excellent quality.

B.—SHAWLS.

General Remarks.

1. KASHMIR SHAWLS from the East, and Imitations thereof.

From the limited nature of a Report of this kind, a complete history of the shawl manufacture will not be looked for, however interesting it might be; but such is the importance of this beautiful fabric, and of its valuable trade, that a sketch of its origin, and of its rapid European development, may well precede our particular remarks upon its present position, and upon the examples now exhibited. The source from which this article has sprung is well known to be the ancient and beautiful fabric of the Valley of Kashmir, where the excellence of the raw material stands to this day unequalled, although its manufacture has been, and is still, carefully prosecuted in many parts of the world. The great beauty of the eastern tissue, considering the rudeness of the means of machinery employed as compared with those which are now available to the European manufacture, is a marvel in the eyes of the most experienced.

The superiority of the woollen fabrics of Kashmir is to be found recorded in many ancient eastern works. In the Mahābhārath, where narrating the transactions taking place at the palace of Gundeshthira, the eldest of the Panda princes, about the period of two hundred years before Christ, it is stated* "that the people of Kaneboja (the northern districts surrounding Kashmir) brought cloths and skins as tribute." The former were made of wool, and embroidered with gold, being, in fact, shawls and brocades.

Again, in the Ayeen Akbery,† being the institutes of the Emperor Jilaleddeen Mohamed Akbar, sixth in descent from Timur (Tamerlane the Great), proclaimed emperor in 1556, we find the following interesting account of shawls:—"His Majesty has ordered four kinds of shawls to be made: 1st. Toos affee (grey affee), which is the wool of an animal of this name whose natural colour, in general, is grey, inclining to red, though some are perfectly white; and these shawls are incomparable for lightness, warmth, and softness. Formerly they were made of the wool in its natural state, but His Majesty has had some of them dyed, and it is surprising that they will not take a red colour. 2nd. Sufed alcheh (white alcha), which they also call terebdar. The natural colours of the wool are

* Vide vol. ii, p. 140.

† Vide vol. I., p. 106.

white or black, and they weave three sorts, white, black, and grey. Formerly, there were not above three or four different colours for shawls, but His Majesty has made them of various hues. 3rd. Zerdozy and others,* which are of His Majesty's inventions. 4th. From being short pieces, he had them made long enough for jamehs (gown-pieces). The shawls are classed according to the day, month, year, price, colour, and weight; and this manner of classing is called *missel*. The *mushrif*s, after examination, mark the quality of each upon paper affixed to its corner. All those brought into the palace on the day Ormuzd of the month Ferirdin (10th March) are preferred to those received afterwards, of the same fineness, weight, and colour, and each is written down in order. Every day there are received into store the following kinds,† and from this account of one day may be formed an idea of what is done in the course of a year.

"Formerly, shawls were but rarely brought from Kashmir, and those who had them used to wear them over the shoulder in four folds (*vide* ancient sculptures), so that they lasted for a long time. His Majesty has introduced the custom of wearing two shawls, one under the other, which is a considerable addition to their beauty. By the attention of His Majesty the manufacture in Kashmir is in a very flourishing state, and in *Lahore* there are upwards of a thousand manufactories of this commodity. They also make an imitation of shawl with the warp of silk and the woof of wool, and this kind is called *mayan*. Of both kinds are made turbans, &c."

With this account before us, it is reasonable to suppose that varieties of every kind were introduced about this period; and the evident encouragement given to these improvements doubtless tended much to the progress of this trade, while these shawls continued to be a favourite article of dress, during the Mahommedan dynasties in particular. After their decline, it is probable that the troubled state of Upper India, and the general turbulence of the mountain character, had its effect in retarding the progress of a trade involving the labour of so many hands; but its absolute necessity as an article of wearing apparel to every well-dressed native of India, Persia, and parts of Turkey, effectually prevented the manufacture from falling into decay, even at the worst of times. It was once said that there were upwards of 30,000 looms at work; but Strachey, who visited the country in 1809, gives 16,000 as the number at that time. The value of the whole produce was estimated at 35 lacs of rupees, but Moorcroft, who was there in 1822-23, says it had declined to half that sum. A renewed vigour has been instilled into it within the last thirty years by the constantly increasing demands of the European markets; and the present improved state of government, of social rights and intercourse, in that part of India, will of course add greatly to the energies of a persevering and painstaking people, and will most probably give early proof that

* Zerdozee, gold-leaved; goolaltun, rose body; kesheede, worked; kulgha, pine-shaped; Bandhemim, spotted; cheet, like chintz; alcheh (ignor.); perzdar, with a nap.

† Toos, grey; sefed, white; lalzerreen, red-golden; narenjee, orange; berenji, rice-coloured; kabzy, straw-coloured; gulpumbeh, rose-cotton; sendely, sandal-wood; badamee, almond; arghuwanee, bright red; anaby, musk-perfumed; asseely, pure; gulkasnee, cockscomb-colour; silcky, light; alifee, marked with alifs or sprigs; festoky, sea-green; pezhgul, a Turkish wood; goolkhear, spotted; nexyberoen, spearhead; asmany, sky-colour; goolabee, rose; kulghy, pine-shaped; aby, watered; sytoony, olive-coloured; segevy, liver-coloured; samroody, emerald; benefee, violet; fakhtehy, ring-dove colour.

its resources have never been fully developed. The valley itself is now in the hands of Golab Singh, a chief who fully appreciates the value of the trade; but many of his measures are oppressive to the manufacturer, and some of the best makers are finding it to their advantage to settle in the neighbouring cities, under the British Government, where they are able in perfect freedom to push their trade to any extent. Umritzer and Lahore are already showing rapid progress in this trade, and there is no reason why their productions should not equal in all respects those of Kashmir; while the demand for Europe is actively promoted by European agents residing there, for the express purpose of encouraging perfection in design, colour, and texture. The activity of the present trade may be estimated from the following returns, procured from the firm of Ripley and Brown, the leading brokers in this trade:—

	Imports.	Deliveries.	Exports.
In 1842	2,484	2,740	2,218
1843	2,726	2,992	2,298
1844	4,957	4,127	2,757
1845	7,981	5,411	3,860
1846	3,709	5,429	3,400
1847	3,980	4,354	3,045
1848*	2,389	1,904	1,484
1849*	1,183	3,311	2,403
1850	6,982	5,753	4,242
1851†	4,034	2,898	2,139

* Troubles in Europe and in India.

† Up to May.

We find publications in France, "*sur la fabrication des châles*," which give the date of about 1800 as the period of the first introduction into France of the taste for this article of dress, and of their first importation from Egypt, where undoubtedly they had found their way from the eastern emporium, chiefly through Persia. In England, however, the fashion had been earlier introduced by those connected with the East India Company's trade, and they were included in the periodical sales of prohibited goods, held at the East India House as early as 1750. In 1787, we find they were admitted by our Custom-house, upon payment of an *ad valorem* duty of 27½ per cent, which duty has since been thus changed, by various acts and regulations:—

1812 - - £81 2 11 per cent.	1825 - - - 30 per cent.
1813 - - 62½ "	1842 - - - 7½ "
1814 - - 67½ "	1846 - - - 5 "

The severe restrictions upon their importation, and their consequent costliness, induced the weavers of Norwich to make the first attempt at imitation of the Indian fabric; and we are informed that in 1784 Mr. Barrow and Alderman Watson, of that town, succeeded in weaving the first Indian style of shawl we believe ever made in Europe. The process was too slow and unprofitable to induce them to continue their operations; but Mr. John Harvey, of the same town, followed up the enterprise with Piedmont silk warp and fine worsted shoot, the design being worked in by a process of darning by the hand. No great progress, however, appears to have been made in this tedious and expensive process, and

not till 1805 was an entire shawl produced from the loom in Norwich. In Paisley and in Edinburgh they took up the manufacture about the same time, but the former town has alone retained it, making India imitations now of real Kashmir wool thread, at very low prices, to a large extent.

In 1802 a commencement was made in Paris; and it is related that the enormous expense of 60,000 francs, expended in setting the loom prepared for the purpose, induced the immortal Jacquard to invent his wonderful process of working intricate designs with facility. In 1819 great success had been reached upon looms à la Tère, with Kashmir wool imported for the purpose, and spun with great skill in France. Not earlier, however, than 1834 was the present process, called *spouliné*, which is the exact imitation of the Kashmirean, so introduced for working intricate designs that one man, with a Jacquard loom, can produce the excellence now attained in Paris. In fact, we find the true Indian shawl there produced, but perfected by the addition of machinery, and sold at about a quarter of the cost in India, their range of prices being, for squares of full size, 25 to 600 francs, and for long shawls of full size 50 to 1,500 francs: 4,000,000 francs is given as about the value of the total production of these fabrics in France at the present time; that of Scotland cannot so easily be estimated, but it is very large, though the shawls are chiefly of a cheaper description, ranging from 7s. 6d. to 5l. for square, and 1l. to 15l. for long shawls. We have dwelt thus at length upon the productions of France and England because of the greater development of the manufacture in these countries, where it had been first introduced; but we find that within the last five years Austria, the States of the Zollverein, and Belgium have been setting their looms upon similar produce; and with such excellent material at command, and such ingenious and industrious artizans, they may soon vie, in cheapness at any rate, with either of their predecessors in the trade. There is a peculiarity in the character of a real Kashmir shawl, as well in originality of design as in solidity and durability, which, notwithstanding the enormous difference of cost, will retain its value in the eyes of those who can afford to pay it. The finer descriptions cannot be purchased in the valley under 300 to 1,500 rupees for square and 450 to 2,000 rupees for long.

Particular Remarks.

We find the following number of contributors of the descriptions called "woven," "printed," "embroidered," and "tartans:"—

	Woven	Printed	Embroidered	Tartans		Woven	Printed	Embroidered	Tartans
France - - -	15	7	4	6	China - - -	-	-	2	-
Algiers - - -	1	-	-	-	England - - -	12	23	10	29
Belgium - - -	-	1	-	1	Egypt - - -	1	-	-	-
Austria - - -	10	1	3	5	Greece - - -	-	-	1	-
Hanover - - -	-	1	-	-	Barbary - - -	-	-	1	-
Zollverein - - -	7	2	-	2	Persia - - -	-	-	1	-
Russia - - -	1	3	-	-	Manilla - - -	-	-	-	-
Turkey - - -	-	-	1	-	Nova Scotia - - -	-	-	-	1
Geneva - - -	-	-	-	1	United States - - -	-	-	-	2
Spain - - -	-	1	-	-	Van Diemen's Land - - -	-	-	-	1
Portugal - - -	2	1	1	-					
India - - -	5	1	-	-					

Among whom we proceed to notice those who are most worthy of remark.

1. WOVEN SHAWLS.

THE HONOURABLE THE EAST INDIA COMPANY has contributed to this Exhibition such a costly and gorgeous display of the very best specimens of every description of manufactures within their dominions, each in its kind so choice and perfect, and of a taste so original, as to afford example to all Europe, that as exhibitors of the most distinguished character we cannot but recommend that their display should be suitably recognised by Her Majesty's Commissioners.

There are many articles which do not strictly come under the cognizance of our Class, but it has been considered preferable to combine as much as possible the Report upon this collection of fabrics, rather than scatter the notices upon each different substance among many Classes.

We proceed to notice particularly,—

From Kashmir, a square shawl of perfect design and tissue; two long, fine white ones, of beautiful texture, and others, presented by MAHARAJAH GOLAH SINGH; some pieces of superior shawl cloths, called kid cloth, and Purrepuz; this is looped in the west at the back.

From Indore, shawls and embroideries and other articles, by MAHARAJAH RAO SCINDEAH,

From Puttealla, shawls, scarfs, and rich tissues, by the RAJAH OF PUTTEALLA.

From Loodiana, shawls for cheapness of price.

From Benares, splendid brocaded shawls and scarfs, from BADOO DEO NARAYN.

From Ahmedabad, the same description of goods.

From Moorsshedabad, the same, with some gold prints.

From Indore, the same.

From Madras and Bengal, beautiful embroidered muslin scarfs and shawls, of remarkable texture and elegant taste.

From Bengal, a very curious white muslin shawl-scarf, worked with gold, in which the turning of the shuttle shows extraordinary skill.

From Dacca, two shawls, embroidered with gold and silver needlework; executed for Her Majesty. Some elegant scarfs, embroidered with coloured silks of Sherry; oriental taste.

From Delhi, some splendid specimens of needlework.

From Ahmedabad, a curious specimen of cloth of gold, worked by hand; exhibited by Mr. CHARLES COPLAND.

From Kashmir, a splendid shawl, worked in many colours with gold and silver; exhibited by the PENINSULAR AND ORIENTAL STEAM COMPANY. A very handsome long shawl, called an Alvandar; exhibited by Mr. JOHN GRAHAM.

It would be endless to point out all the excellencies which this portion of the Exhibition puts forth. The entire Catalogue of the Indian department may be well called the correct list of them, for all of them are worthy of notice, and will, no doubt, afford to manufacturers of all nations a means of finding that they have still something to learn.

CLABURN and SON, Norwich (No. 284, Class XII. and XV., p. 80), are exhibitors of the very first-class shawls of a similar style and perfection. They also present poplins, paramattas, and a variety of beautiful fabrics of the highest order. The fabrics of this firm are remarkable for their perfection of manufacture,

and good taste in design, for their variety and novelty, and for all those qualities which characterize first-rate manufacturers; but a member of the firm being upon this Jury, their productions are not under our review for particular distinction.

GAUSSEN and Co., 1 Rue de la Banque, Paris (No. 1242, France, p. 242), have furnished a selection of very beautiful shawls of Indian wool, got up in the most perfect and classic style. Their manufacture is of the highest class; but the leading member of the firm being upon our Jury, they are out of the pale of competition.

MORGAN, JOHN, and Co., Paisley, Scotland (No. 299, Class XII. and XV., p. 80), have contributed a fine collection of shawls of the highest character for design and manufacture. They are dyers of their own yarn, and dressers of their own produce, and are in all respects manufacturers of the very first repute; but the senior member being upon this Jury, their goods are not under consideration for any Prize distinction.

WEBBER and HAIRS, London (No. 277, Class XII. and XV., p. 80), have exhibited a great variety of printed shawls of excellent taste. Mr. Hairs being, however, an Associate Juror, their goods do not come under Prize consideration.

Council Medal.

DENEIROUSE, E., BOISGLAVY, and Co., 16 Rue des Fossés, Montmartre, Paris (No. 1182, France, p. 241), for a long white shawl, made precisely upon the same principle as those of Kashmir, and distinguished by the character of "spouliné." This shawl is of peculiarly fine texture and design, combining natural flowers, in all their various tints, with the style peculiar to India: it is perfect in all respects. There is also a long white, of a new and original design; it is remarkable for the introduction of a new process, adapted to the Jacquard loom, by which, with the usual colours, a great variety of tints may be made by combinations of different threads in the web. This is a new and important discovery, which, added to the excellence of their manufacture, in all respects entitles these exhibitors to the recommendation of the COUNCIL MEDAL, and this award was confirmed.

The Jury award Prize Medals to the following Exhibitors:—

BERGER, JOSEPH, and SON, Vienna (No. 309, Austria, p. 198), for a highly-creditable collection of shawls of elaborate style, a long one in particular with various-coloured compartments, and a square of Kashmir wool worked with gold, are deserving of great merit for good taste and colouring; others of entire wool are highly creditable for their moderate cost.

BLAKELY, E. T., Norwich (No. 285, Class XII. and XV., p. 80), for a square shawl of purple ground with many compartments, of various colours, in which gold is introduced, perfect of this particular school. The *barège* scarfs are of superior quality and novel taste. His goods are of the highest merit.

BLISS, WILLIAM, Chipping-Norton, Oxfordshire (No. 270, Class XII. and XV., p. 80), for a variety of shawls, made from different materials, and of great merit for the adaptation of new articles for tissue, such especially as the *vicugna*, which is here shown to great advantage: he is an enterprising manufacturer of great merit.

BOAS BROTHERS, Paris (68 France), for shawls of a very particular style, and of

extraordinary composition; we notice in particular a long white of curious design and colouring, which possesses much originality, and is well manufactured. Their shawls are of Indian wool yarn, and deserving of a high degree of credit.

DAMIRON and Co., 6 Rue des Capucins, Lyons (No. 1167, France, p. 241), for a collection of fine wool shawls of good style and make, and at very moderate prices.

DUCHÉ and Co., 1 Rue St. Petits Pères, Paris (No. 1592, France, p. 249), for great general excellence. This firm manufactures the largest quantity of fine shawls in France, and has exhibited the greatest variety of rich specimens in this Exhibition. They are of superior make and design. We particularly call attention to a long white shawl, of extraordinary manipulation, manufactured entirely of Indian wool yarn, and the finest ever made, having 320 shoots to the inch. Another long white, of new and original aspect: the inner border is formed by double grounds, shaded of different tints, graduating from the darkest to the lightest; the colours, being clear and distinct, show the design in all its perfection. Gold and silver threads are used both in warp and weft, to increase the number and brilliancy of the tints. There is also a square, with different compartments of various colours and ground, of very perfect design. We considered that the Council Medal should be awarded to this Exhibitor; but this recommendation was not confirmed by the Council of Chairmen. The productions of this house are of the very highest order of perfection, combining excellence in material, manufacture, colour, and design, with much originality.

FORBES and HUTCHISON, Paisley (No. 291, Classes XII. and XV., p. 80), for cheapness of manufacture and general excellence.

GAUSSEN, FARGETON, and Co., 2 Place des Victoires, Paris (No. 1243, France, p. 242), for a variety of shawls of India wool, with very elaborate effects, and of superior manufacture. We notice particularly a long white on two grounds, in which there is excellent harmony in colouring and design; again a square white of very rich style and careful manipulation. In all there is great merit.

GRILLET and Co., 11 Place Croix-Paquet, Lyons (No. 1259, France, p. 243), for two long shawls of very elaborate design and excellent manufacture. The striped pattern is worthy of particular notice for novelty and harmony: their known superiority of manipulation gives rise to regret that they have not exhibited a greater variety.

HÉBERT, F., and SON, 13 Rue du Mail, Paris (No. 1621, France, p. 249), for shawls woven from Indian wool yarn of the very first class, being a classic and harmonious imitation of the Indian style. There is a long one with ground of four colours, very successful in its colouring; a square amber colour is very true to its Indian origin; and altogether this firm is decidedly worthy of merit for its careful products.

KERR, ROBERT, Paisley, Scotland, and of the firm of Kerr and Scott, London (No. 300, Class XII. and XV., p. 80), for remarkably fine specimens of every description of shawl, in all textures, all of which are stamped with the character of superiority, and the highest degree of skill in manufacture. We consider his goods to be pre-eminent in design, novelty, variety, and texture, and accordingly recommended him for the Council Medal, which the Council of Chairmen did not, however, grant.

LION BROTHERS, and Co., 9 Place des Petits Pères, Paris (No. 1327, France, p. 244), for a handsome collection of shawls, of elaborate design and excellent make; a long white is well worthy of notice. There are two squares of peculiar style, in which the white and yellow effects are produced by gold and silver thread. Their manufacture is of distinguished merit.

MERLIN, A. and V., Government of Riasan (No. 281, Russia, p. 299), for a long white shawl made of fine wool, conspicuous for its beautiful texture, and for a handsome border of modern floral design, quite original, which presents the same effect on each side of the shawl, the centre being sewed in according to the Indian manner. It is a novel and extraordinary production of high merit, and though scarcely to be considered an object of trade, it may lead to one of importance hereafter.

ROBERTSON, J. and J., Paisley (No. 301, Classes XII. and XV., p. 80), for cheapness of manufacture and general excellence.

TOWLER, CAMPIN, and Co., Norwich (No. 309, Class XII. and XV., p. 80), for a very choice collection of long shawls, of different compositions of spun silk and wool. They are of elaborate and original designs, showing superior skill in workmanship, and the highest degree of merit a manufacturer can attain. Every improvement is here adopted without abandoning the distinguished character of the original Norwich style. We find also printed shawls on a grenadine gauze of great merit, and a square with silk worked on cashmere ground, very beautiful. All their productions show great perfection in a school peculiar to this town, and always to be admired, and they are of the highest degree of merit. We, therefore, recommended a Council Medal to these exhibitors; but it was not conceded by the Council of Chairmen.

ZEISEL, J. and J. and C. BLÜMEL, Vienna (No. 320, Austria), for a collection of shawls, among which a long white of woollen warp, and another with four compartments of elaborate French designs in good taste, made of Cashmere wool, are worthy of particular remark for excellence of manufacture. Others of more moderate cost are also deserving of great merit, showing much perfection in the working of their woollen thread.

The Jury make Honourable Mention of the following Exhibitors—

BONFILS, SOUVRAZ, and Co., 3 Rue des Fossés, Montmartre, Paris (No. 1094, France, p. 240), for specimens of shawls of excellent design and manufacture; we point in particular to a long one with pink ground and orange compartments: a very successful combination, and possessing much novelty.

CHAMBELLAN, G., and Co., 8 Rue des Fossés, Montmartre, Paris (No. 1140, France, p. 241), for a collection of shawls of superior manufacture from Indian wool yarn; in particular a long one of excellent design, and a square in four compartments, are well worthy of notice.

CHINAED, CHARLES, 9 Rue de Cléry, Paris (No. 89, France, p. 221), for a collection of shawls of very good make and careful combination of colours; particularly a new style of square adapted for summer fashion, differing from the ordinary method of weaving.

HALEY, JOHN, and SON (No. 58, Classes XII. and XV.), for some peculiarly

soft flannel shawls, made of goats' hair, the produce of stock reared by H.R.H. Prince Albert in Windsor Park.

HAYDER, SEBASTIAN, Vienna (No. 311, Austria, p. 198), for moderate-priced goods, and very creditable specimens of long shawls of good effect at from 40s. to 45s., and a black square at 24s., which are decidedly cheap.

MARX and WEIGERT, Berlin (No. 113, Prussia, p. 255), for a collection of long and square shawls on spun silk warp, with wool and mixture weft; of good design and very effective, and of moderate prices.

OPDENHOFF and HARTUNG, Berlin (No. 134, Prussia, p. 256), for several harness shawls, as well as tartans, of good taste and manufacture; their colours are few but effective, and prices very moderate.

PIN-BAYARD, Roubaix, for a collection of damask worsted shawls, of peculiarly soft texture and excellent make: when their moderate cost is considered we cannot but give him much credit. (Prize Medal awarded in Class XII.)

REINHOLD, W., Vienna (No. 315, Austria, p. 198), for a variety of long and square shawls of very good taste in colour and design, and for effective goods at a low price.

RISS, JOSEPH, Vienna (No. 316, Austria, p. 198), for shawls of a low quality, presenting them solely for merit as to cheapness.

ROXBURGH, JOHN and ANDREW, Paisley (No. 296, Class XII. and XV., p. 80), for specimens of woven shawls, of good designs; also shawls made on spun silk warp, in which an ingenious advantage is taken of short reeding in design, which reduces the expense of production.

SAHN, REBEYRE, Lyons, for a good assortment of cravats, scarfs, square and long shawls, of good colouring and design, chiefly suited to a large consumption at low prices.

2. SHAWLS OF BARÈGE, CRAPE, GAUZE, SILK, AND OTHER DESCRIPTIONS.

General Remarks.

The rapid progress in the manufacture of shawls, and the increasing taste and demand for this style of garment, has led to the introduction of many kinds of lighter fabrics, in either wool, silk, goats' hair, or the various combinations of these with other materials, such as cotton, spun silk, &c.

These descriptions are generally traded in under the following denominations:—

Crapes, made of silk, in imitation of Chinese fabrics; chiefly manufactured at Norwich and Lyons.

Barège, made of wool, an improved imitation of shawls made in the Pyrenees, by the peasantry of a place so named; remarkable for their lightness, elasticity, and strength.

Another sort, with silk warp, and with a check of silk; a new introduction for increasing the effect of printing.

Grenadines, made of silk of a peculiar twist, which gives hardness and durability, but at the expense of brightness.

Levantines and Albanians, made of silk and spun silk, in imitation of the scarfs from various parts of the Mediterranean.

Chenille, a novel application of silk, sometimes with cotton.

Chiné, a printed warp before weaving.

The trade in these articles has already in a few years become most important, giving employment to an immense number of artisans in various branches besides those of spinning and weaving, such as designers, carvers, chemical colourists, and dyers.

In the perfection of these goods France has taken the lead, and to her early encouragement of schools of design, and well-known national taste, may be attributed the tone and fashion she has given to all Europe; but her work is more expensive than that of England, and large quantities of these goods are brought over to be printed here at the lower cost, which the greater division of labour and the more extended development of the trade has accomplished.

In these printed articles, Austria shows evidences of an active endeavour to produce imitations of the designs of France.

In the exhibition by the States of the Zollverein we also perceive the foundation of a future trade in these fabrics.

Particular Remarks.

The Jury award Prize Medals to the following Exhibitors in this department :—

CHOCQUEEL, FELIX, Paris (No. 1148, France, p. 241), for great excellence in the printing of light shawls. For a long time foreman to his brother, he has acquired much of his perfection. We point especially to a long white shawl of elaborate design, the cutting and printing of which prove him to be a manufacturer of great merit.

CHOCQUEEL, LOUIS, Labricht, near St. Denis (No. 90, France, p. 221), for a collection of printed shawls, on barège, cachemire d'écosse, and other fancy goods, of great excellence in design, harmony of colours, and perfection of printing, which is conspicuous in the great clearness of his white grounds, the whole being of the very highest merit. (Medal awarded in Class XVIII.)

GLEN and McINDOE, Glasgow (No. 279, Class XII. and XV., p. 80), for the economical execution of the printed shawls exhibited by Messrs. Keith, Shoorbridge, and Co.

KEITH, SHOORBRIDGE, and Co., 124 Wood Street, London (No. 279, Class XII. and XV., p. 80), for a large collection of printed shawls, scarfs, and mufflers, of excellent designs and execution. They are deserving of merit for the goods they have made up on their own designs. But to Glen and McIndoe, Glasgow, their printers, we consider much credit to be due, for the execution of the detail, which for colour and neatness is very remarkable.

SWAISLAND, C., Crayford, Kent (No. 283, Class XII. and XV., p. 80), for goods that prove him to be a printer of the very first class. We point especially to an elaborate design on a barège ground, which has required 550 blocks to complete the pattern. The colouring is bright and clear; the execution perfect. At his extensive works the art of printing on wool has been carried to great excellence.

THIRREY-MIEU, Mulhouse (No. 1506, France), for a large collection of shawls,

square and long. The designs are of classic style, clearly and neatly executed, and the sharpness of outline well preserved. The goods are cheap, and of decided merit.

TOWLER, CAMPIN, and Co., and E. T. BLAKELY, Norwich, are both manufacturers and exhibitors of first-class printed goods, but have received their awards of merit under the head of woven shawls.

The Jury make Honourable Mention of the following Exhibitors:—

DEPOUILLY BROTHERS, BOIVAUD, and Co., Paris (1586, France), for a good selection of *barège* shawls, printed with taste and accuracy. The colours and composition do much credit to M. Boivaud, the designer.

GODEFROY, LEON, Purteaux (No. 1252, France, p. 243), for a few specimens of shawls printed on fancy *barège*, with dark grounds of great perfection in clearness and precision. He is a printer of the first class; but having a larger collection of dresses than of shawls, he will be more particularly noticed elsewhere.

JAMESON and BANKS, Honey Lane Market, Cheapside, London (No. 278, Class XII. and XV., p. 80), for a large collection of superior shawls on various grounds, some with novel floral designs, executed in the most perfect manner, and printed by the first men in the art; such as Swaisland, Littler, and David Evans and Co.

LAWSON, J., and Co., Caledonia Print Works, Paisley (No. 294, Class XII. and XV., p. 80), for excellent specimens of printing, of good, effective, and clear designs, which are moderate in price.

LEWIS and ALLENBY, Regent Street, London (No. 276, Class XII. and XV., p. 80), for a design of their own composition of peculiar Indian style, very classic and effective; printed on several grounds by Swaisland in a superior manner.

LITTLER, MARY ANN, Merton Abbey, Surrey (No. 282, Class XII. and XV., p. 80), for shawls of Indian style, designed and executed by herself, showing great excellence in the art of printing. (Medal awarded in Class XVIII.)

3. SHAWLS, EMBROIDERED WITH WOOL, SILK, THREAD, GOLD, SILVER, &c.

General Remarks.

There is no doubt of the origin of this description of manufacture being traceable to eastern nations, where, in truth, we still find the most perfect workmanship and the greatest variety of design, with perfection of colouring. There unquestionably all uses of the embroidery-needle have been learned. The web of Penelope was no new thing in her time to the nations farther east. The Israelites were enjoined to have the door of the tent of their first tabernacle a "hanging of blue and purple, and scarlet and fine twined linen, wrought with needlework."* Deborah, in her song of triumph, 1296 years B.C., sings of the "prey of divers colours of needlework, of divers colours of needlework on *both sides*."† No better evidence can be needed of the antiquity of embroidery.

We have from China some specimens of the most exquisite work of this kind, unsurpassed by that of any other nation. We regret that nothing has been sent from Japan, where it is understood that embroidery is carried to great perfection.

* Exodus, chap. xxvi., v. 36.

† Judges, chap. v., v. 30.

It is most probably from Tartary that Russia has derived her excellence; the specimens produced on this occasion not being shawls, will, we trust, be noticed in their proper Class. India stands pre-eminent in the exhibition of embroidered shawls, whether in coloured wool or silk, upon Kashmirs, cloths, or in gold and silver brocades; in short, in almost every variety of form or description.

Persia is not fairly represented on this occasion, for she has artisans of the highest merit; witness the beauty of her carpets, a species of embroidery in the manner of their manipulation; and she could have sent some excellent shawls, scarfs, and roomals.

Turkey has given a very handsome display of the excellence of her manufactures, and of the richness of her taste in embroidery of every kind; but her shawls do not evince equal talent or originality, being mostly copies of Indian designs.

Greece exhibits only some gauze scarfs, worked with tinsel. She does not appear to maintain the character she formerly held for this kind of work.

Egypt shows no originality in this fabric; her silk and gold scarfs are not of a fine character, and are of the same description as those of Turkey.

In Paris, Paisley, and Vienna the embroidery of shawls and scarfs on various materials is carried to great perfection; but the demand for such goods is not very great, the process being naturally expensive.

Particular Remarks.

Turkey.—The Government of Constantinople have placed on view a valuable collection of embroidered scarfs and roomals (handkerchiefs), of superior taste and fabrication, fully maintaining the renown of Levantine manufactures. The shawls are scarcely equal in character for excellence. There are some kumcabs, made at Damascus, worthy of remark; also some Albanian scarfs, of cotton cloth mixed with silk and tinsel, made at the Imperial factory; not without merit, considering the difficulties attending the introduction of machinery into that country. Altogether, the collection is a valuable exhibition of the progress of manufactures in Turkey, and worthy of the most Honourable Mention.

India.—The East India Company's Collection has already had special notice. We however point particularly to the gorgeously-brocaded square shawls, and the long red shawls embroidered with gold and pearls; to the muslin scarfs embroidered with gold thread and beetles' wings. It would be tedious to mention the various excellencies, as all are of the very highest order of merit.

The Jury award Prize Medals to the following Exhibitors:—

FOULQUIÉ and Co, Paris (No. 1603, France, p. 249), for net shawls, embroidered with silk, rich, elegant in design, of novel character, well executed, and quite worthy of the Prize Medal. (Medal awarded in Class XIX.)

GRAHAM, JOHN, Ludgate Street, London, embroidered crape shawls of peculiar excellence in texture, colour, and design. They are probably the finest specimens ever brought from China, and of the highest possible merit. We hold the Exhibitor to be worthy of the Prize Medal, as the importer.

LAFORTA, H. F., Vienna (No. 387, Austria, p. 200), for embroideries on several textures, most of which show great skill in that art, and a perfect adaptation of material to colour and design.

WHITEHILL, M., and Co., Paisley (No. 287, Class XII. and XV., p. 80), for superior merino shawls embroidered with silk, of which the taste and execution are conspicuous, proving them to be manufacturers of high merit.

The Jury make Honourable Mention of the following Exhibitors:—

HENRY, EBENEZER, and SONS, Glasgow (No. 13, Class XI., p. 73), for a good selection of embroidered merinos, of good taste and execution.

MAIR, JOHN, SON and Co., Glasgow (No. 59, Class XI., p. 74), for a good selection of embroidered merinos of good taste and execution. (Medal awarded in Class XIX.)

SIEBERT, FREDERICK, Vienna (No. 271, Austria, p. 197), for well-executed embroideries.

4. TARTAN PLAIDS, SHAWLS, SCARFS

General Remarks.

This peculiar manufacture is of very ancient date, and many learned researches have been made to endeavour to trace its introduction into the British Isles, and into Scotland in particular, where it has so long remained the well-known national costume, giving a name to its peculiar style that is universally adopted in every part of the world where the manufacture is produced or traded in. Great difficulty has been found in the derivation of the word Tartan: it does not appear in Gaelic, nor was it used in the Highlands, where the word Breachan was its equivalent, until the sixteenth century. The ancient bards invariably used the word Breach or Breachan in Scotland, Brycan in Wales, and Breacan in Ireland, where the dress prevailed from very early times. A woollen fabric of this description appears to be clearly traced from the northern tribes of Europe, very far east. In Russia, and among the Calmucks, it is common to this day; in Burmah, the chequered design, although mostly in silk, is the common dress of the country. There are strong evidences of its having been of Scythian wear; it may be fanciful to trace Tartan to Tartaric origin, but it is curious to find the Arabic word *Berkan* meaning "party-coloured." Livy describes the party-coloured woollen cloths of the Gauls, Germans, and Goths. Pliny, again, states that the dress of the Gauls was woven in squares of party-coloured fine wool. Dio, writing in the third century, describes the Britons in cloths of divers colours, which were called by their bards "Breach," or "Breachan." There is no record of their having been the distinctive dress of the clans of Scotland before the sixteenth century; but in a chartulary of Aberdeen, in 1269, the Canons of the Church forbid the clergy to wear the party-coloured garments, under the name of *Tyretains*. This word was brought into use from Normandy, in the eleventh century, and may very probably be the origin of the word Tartan, for it is frequently used in reference to these woollen cloths of many colours. In the fifteenth century the records of the Royal Wardrobe give an item of expenditure, describing the colours of these Tyretains. In 1570 an ancient Scottish manuscript gives a list of the colours of the plaids of the different clans. In 1747 the wearing of this distinctive dress was prohibited by Act of Parliament, and the grey shepherds' mauds were made instead. This Act was, however, repealed in 1782, but the fashion was not actively revived until very lately. The visit of George IV. to Scotland, in 1822, gave the first impulse

to this revival, and in the neighbourhood of Stirling fancy plaid shawls began to be made. In 1828 clan tartan shawls, long and square, became very popular. The Galashiels weavers took up the trade very actively, and from that period the consumption has each year been greatly on the increase. Paisley opened extensive manufactories about eight years ago, which now throw off a vast quantity. The example of that town was quickly followed by France, Belgium, many parts of Germany, Austria, and Bohemia; and in 1849 a very extensive concern was opened in Massachusetts, North America, for the production of this fabric from native wool, which has given evidence of excellence that will compare with any other country. We find also a specimen from Canada; but in this article it will probably be long before Scotland can be surpassed in design, fabric, or cheapness.

Particular Remarks.

MORGAN, JOHN, and Co., Paisley (No. 299, Class XII. and XV., p. 80), have a very handsome collection of tartans of very superior make; but, as already stated, they are not under consideration for distinction in consequence of Mr. Morgan being a member of the Jury.

The Jury award Prize Medals to the following Exhibitors in this department:—

CROSS, WILLIAM, 62 Queen Street, Glasgow (No. 202, Class XII. and XV., p. 78), for tartans of fine Indian wool, of superior make, the colours excellent, and the tissue perfect.

KERR and SCOTT, 31 and 32 St. Paul's Churchyard, London (No. 275, Class XII. and XV., p. 80), for a variety of tartans of the very best description, manufactured by Robert Kerr, the beauty of whose fabrics has already been fully appreciated by this Jury.

LAWRENCE, STONE, and Co., Boston, United States (No. 464, United States, p. 191), for a few tartans of excellent manufacture, fine in texture and bright in colours. They are made from native wool, and show much excellence as the produce of a manufactory only three years at work, but estimated to turn out this year 5,000,000 pieces. This concern, from its rising importance, is considered to be of decided merit.

LEES, R. and G., Galashiels, Scotland (No. 192, Class XII. and XV., p. 78), present such perfect specimens of their manufacture that we cannot but consider them as makers of the highest merit, and fully entitled to the Prize Medal.

PATON, J. and D., Tillicoultry, Scotland (No. 466, Class XII. and XV., p. 81), for a collection of tartans remarkable for their fineness and softness of texture, for the excellence and variety of their colours, and perfection of make.

SANDERSON, R. and A., and Co., Galashiels, Scotland (No. 196, Class XII. and XV., p. 78), for an excellent collection of tartans; their mauds, or shepherds' checks, are particularly worthy of notice.

VAN DER BEECK, J. C., Dusseldorf (Prussia, 494), for a collection of fancy tartans, with ends brocaded, of peculiar style. The taste and execution are both superior; and with reference to moderate price, this manufacture is considered to possess a decided merit.

The Jury make Honourable Mention of the following Exhibitors :—

HAAERHAUS, J. C., SONS, Elberfeld (Prussia, 567), for a good collection of medium-priced tartans, well made and of good colours. They are extensive manufacturers.

HOLMS, WILLIAM, and BROTHERS, 7 St. Mirren's Street, Paisley (No. 288, Class XII. and XV., p. 80), for a complete collection of clan tartans, sixty-two in number, got up with great care, of excellent colours.

WILSON and SON, Bannockburn (No. 468, Class XII. and XV., p. 81), for a collection of clan tartans, fifty-eight in number, of good colours and strong manufacture. They well merit Honourable Mention.

In presenting this our Report upon Class XV., we have, in the faithful execution of our trust, unanimously decided that among the beautiful and elaborately-made textures which have come under our examination such perfection of various kinds of merit has been found, that according to our interpretation of the instructions of the Council of Chairmen we could not do otherwise than recommend those Exhibitors who have presented a combination of such different merits as are unquestionably pre-eminent in their Class, and therefore entitled to the Council Medal, which we trust will be confirmed.

WILLIAM PRINSEP, *Reporter.*

London, July 1851.

CLASS XVI.

REPORT ON LEATHER, INCLUDING SADDLERY AND HARNESS, SKINS, FURS, FEATHERS, AND HAIR.

Jury.

Col. the Hon. GEORGE ANSON, *Chairman*, 25 Hill Street, Berkeley Square.
CHARLES NOTTEBECK, *Deputy Chairman*, Russia; attached to the Ministry of Imperial Domains.

J. A. NICHOLAY, *Joint Reporter*, 82 Oxford Street; Furrier.

JAMES B. BEVINGTON, *Joint Reporter*, Neckinger Mills, Bermondsey; Leather Manufacturer.

J. S. CUNNINGHAM, United States.

JAQUES FRIEDÉRIC FAULKER, France; Member of the Chamber of Commerce.

JOHN FOSTER, 16 Wigmore Street, Cavendish Square; Florist and Feather Manufacturer.

J. W. NEWMAN, Walsall; Saddler and Harness Manufacturer.

HECTOR ROESSLER, Zollverein; Counsellor of Commerce.

EDWARD ZOHRAB, Turkey; Turkish Commissioner.

Associate.

GEORGE KIDD, 257 Oxford Street; Saddler and Harness Maker.

THE JURY, for convenience and certainty in examination, have distributed the articles exhibited in this Class under the following heads:—

Skins and manufactured furs.

Feathers for ornamental purposes.

Artificial hair.

Woven hair for furniture.

Rough, tanned, and sole leather.

Curried leather.

Varnished leather.

Morocco and dyed sheepskin leather.

Alum and gloving leather.

Oil or chamois leather.

Dyed sheepskins for rugs.

Vellum and parchment.

Saddlery and harness.

Portmanteaus.

The manufacture of the skins of animals into the various useful articles to which they are applicable, has been at all times an important branch of industry, and is estimated to hold the fourth place among the manufactures of England in respect to the value of the produce and the number of persons employed.

The hides, skins, and furs upon which this labour is employed, are mostly the produce of our own country, but besides the home supply, immense quantities are imported from North and South America, Europe, and the East Indies. The estimated number imported into Great Britain annually is about 11,000,000, of which 5,000,000 are applicable for furs, and 6,000,000 are adapted for various descriptions of leather.

The following Table shows the number of unmanufactured hides and skins annually imported into Great Britain for tanning and leather-dressing, a large portion of which are re-exported in the raw state :—

Hides and kips - - -	2,550,000	Brought forward -	4,105,000
Calf-skins - - -	270,000	Sheep skins - - -	210,000
Horse hides - - -	228,000	Lamb skins - - -	1,430,000
Seal skins - - -	593,000	Kid skins - - -	48,000
Goat skins - - -	464,000	Deer skins - - -	90,000
Carried forward - -	4,105,000	Total - - -	5,883,000

Subjoined is a Table of the imports and exports of skins adapted for furs :—

	Total Importation into England.	Exported.	Consumed in England.
Racoon - - - -	525,000	525,000	None.
Beaver - - - -	60,000	12,000	48,000
Chinchilla - - -	85,000	30,000	55,000
Bear - - - -	9,500	8,000	1,500
Fisher - - - -	11,000	11,000	None.
Fox, Red - - -	50,000	50,000	None.
" Cross - - -	4,500	4,500	None.
" Silver - - -	1,000	1,000	None.
" White - - -	1,500	500	1,000
" Grey - - -	20,000	18,000	2,000
Lynx - - - -	55,000	50,000	5,000
Martin - - - -	120,000	15,000	105,000
Mink - - - -	245,000	75,000	170,000
Musquash - - -	1,000,000	150,000	850,000
Otter - - - -	17,500	17,500	None.
Fur, Seal - - -	15,000	12,500	2,500
Wolf - - - -	15,000	15,000	None.
Martin, Stone and Baum	120,000	5,000	115,000
Squirrel - - -	3,000,000	100,000	2,900,000
Fitch - - - -	65,001	28,276	36,815
Kolinski - - -	53,410	200	53,210
Ermine - - - -	187,104	None.	187,104
Rabbit - - - -	120,000	None.	120,000
Wolverine - - -	1,200	1,200	None.
Skunk - - - -	1,200	1,200	None.
Sea Otter - - -	100	100	None.

The temperate and tropical countries supply the peculiar descriptions of hides and skins which are best adapted for leather, while the northern and arctic regions abound in races of beautiful animals which are thickly covered with fine hair or fur, whose skins are extremely valuable as articles of clothing.

To prepare the skins from the raw state, and render them fit for ornamental dress, is the first process of the fur-dresser. In this country it is the usual practice to trample them in closed tubs with a little salt butter, turning them

over and over for several hours: by this means the skins are made into soft and pliable leather. The next operation is to ruh them on the flesh side over a blunt iron to remove loose pieces of integuments, and to reduce the substance, after which it is necessary to cleanse the fur and skin completely from the grease: for this purpose, it is again trampled with sawdust (usually from mahogany), which being beaten out, and repeated several times, conduces to make the fur glossy and clean, and to fit it for the cutter to fashion into any shape that may be required.

The fur of most animals is in its greatest perfection at the approach of winter, and before the animal has attained its greatest age. It is the object of the furrier, by dyeing the inferior skins, to imitate the more perfect specimens. Some difficulty has attended this process, as the nature of the skin will admit of the dyes being used only in a cold state; but the method which has been practised in Paris and London has been so far successful, that the permanence of the colour in the dyed sable is frequently found of equal durability to that of skins of the natural colour. Considerable excellence has been attained also in dyeing rabbit and inferior furs of those colours which are more suitable to the prevailing taste.

The several contributions of furs in the Exhibition, taken as a whole, form a complete collection of all the skins known to be used for ornament or dress; those of the HUDSON'S BAY COMPANY, and the CENTRAL COMMITTEE OF NOVA SCOTIA, are adorned with some of the choicest skins known to commerce; but our notice would be very incomplete if we omitted to mention the remarkably beautiful and extensive collection of skins, and specimens of taxidermy, furnished to the Exhibition by several members of the nobility and other gentlemen, under the superintendence of Messrs NICHOLAY and SON, of Oxford Street. We have also to notice the valuable articles exhibited by the same firm, on which the Jury made the following minute, 9th July 1851:—

The Jury having closely examined the extensive and interesting collection of furs exhibited by Messrs. Nicholay and Son, Her Majesty's furriers (No. 301), as well as the large assortment of manufactured articles, of excellent design and workmanship, resolve—that they consider them worthy of especial notice, and have pleasure in recording their judgment that the collection would fully entitle Messrs. Nicholay and Son to a Prize Medal, which they are precluded from awarding them, in consequence of one of the firm being a member of this Jury.

We proceed to give a brief account of the animals that are captured for their fur, the skins of which are exhibited in various parts of the Building, commencing with—

The Russian Sable (*Mustela sibirica*).—This rich and beautiful skin has long been esteemed one of the most valuable and useful furs that have been brought to our country. About 25,000 are annually collected in the Russian territories, of which only a small number is imported into England. The fur is brown, with some grey spots on the head. The darker varieties are the most highly valued, a single skin being frequently sold for 9*l.*, though the average value does not exceed 2*l.* or 3*l.* Naturalists are not agreed whether to consider the animal from which the skin is procured as a distinct species. Some are of opinion that the Russian sable, the stone and pine martens, as well as the Hudson's Bay sable, are

but one species, on which the differences of food and climate have produced some slight variations in form and colour. To the furrier, however, the Russian sable is easily distinguishable, from the length and fulness, as well as the darker colour of the fur. The use of this choice variety is necessarily limited to the wealthy, on account of its high value. In the reign of Henry VIII., by a law which sought to regulate the expenses of the different classes, and to distinguish them by peculiarity of costume, the use of the sable was confined to the nobility above the rank of viscount.

Hudson's Bay Sable (*Mustela Canadensis*).—The sable skins next in repute to the Russian are those imported by the Hudson's Bay Company, of which no less than 120,000 are annually brought into this country. As the natural colour of the skins is much lighter than the prevailing taste, it is the practice to dye many of them a darker colour, and the furs thus treated are scarcely inferior to the natural sable.

Baum or Pine Marten (*Mustela abietum*).—The sables imported under this name are the produce of Europe. The animal is found in extensive forests, remote from the habitations of man, and preying on birds and the smaller animals. They are distinguished from the stone marten by the yellow colour of the throat; other parts of the skin are brown. When dyed, they have a similar appearance to the best sable.

Stone Marten (*Mustela saxonum*).—This marten is generally found in mountainous and stony places, though a frequent visitor to farm-yards and homesteads. It is generally distributed through most European countries. The under fur is a bluish white, with the top hairs a dark brown. The throat of this variety is usually of a pure white, by which character it is generally distinguished. The French manufacturers excel in dyeing this fur, from which circumstance it is frequently called French sable. It is also dyed in this country, the excellent qualities of the skin adapting it to a great variety of purposes to which furs are applied.

Fisher.—There are about 11,000 of these skins annually brought to this country from North America: they are larger than the sables, and the fur is longer and fuller. The tail is long, round, and full, gradually tapering to a point, and quite black: a few years since it formed the common ornament to a national cap worn by the Jew merchants of Poland, and at that time was worth from 6s. to 9s., but its present value does not exceed 6d. to 9d.

Mink (*Mustela vison*).—There were 245,000 skins of this little animal brought to this country last year from the possessions of the Hudson's Bay Company and North America. The fur resembles the sable in colour, but is considerably shorter and more glossy. It is a very durable and useful fur, and is exported in large quantities to the Continent.

Ermine (*Mustela erminea*).—This animal is similar in form and habit to the common weasel of this country; but in Siberia, Russia, and Norway, from whence the skins are imported, the little animal, during winter, becomes as white as the snowy regions it inhabits, and is esteemed as the whitest fur known, though its summer dress is a dingy brown. The tail of the skin, of which the lower half is jet black, is generally introduced as an ornament to the purely white fur. It is worn on state occasions, and in the reign of Edward III., its use was restricted to the royal family.

Fitch or Polecat (*Mustela putorius*).—These skins are produced throughout Europe, and in no place of better quality than in our own country. The ground of the fur is a rich yellow, while the top hair is a jet black. This fur is at present very little used in this country, but is much worn in America. It is very durable, but the natural smell of the fur, which is rather unpleasant, is difficult to counter-act.

North American Skunk (*Mephitis Americana*).—The skins known under this name are imported by the Hudson's Bay Company. The animal from which they are taken is allied to the polecat of Europe, and, from the factor it emits when attacked, which has been known to affect persons with sickness at 100 yards distance, has received the sobriquet of "Enfant du Diable." It has a soft black fur, with two white stripes running from the head to the tail, which is short and bushy. The skins, though imported into England in small numbers, are usually re-exported to the continent of Europe.

Kolinsky (*Mustela Siberica*).—The Kolinski or Tartar sable is of a bright-yellow colour, and is sometimes used for ladies' dress in its natural state, but it is more frequently dyed brown to imitate other sable, to which it bears a strong resemblance. It is remarkable for the uniformity of its colour, having no spot or difference of shade in any part of the body. The tail, which is of the same colour, is exclusively used for artists' best pencils.

Musquash, or Musk Rat (*Fiber sibethicus*).—The animal known under this name is found in great numbers in North America, frequenting swamps and rivers, and, like the beaver, building its habitations of mud with great ingenuity. Dr. Richardson states, that it has three litters of young in the course of the summer, producing from three to seven at a litter. The animal has a peculiar smell, similar to that of musk; but it must not be mistaken for the animal from which the musk of commerce is procured, which is a native of Tibet. About one million skins are brought to this country annually: the fur resembles that of the beaver, and is used by hat manufacturers. The skins are also dyed by the furrier, and manufactured into many cheap and useful articles.

Nutria, or Coypou (*Myopotamus coypus*).—This rodent quadruped is an expert swimmer, and frequents the neighbourhood of water, where it lives in burrows; it is smaller than the beaver, and considerably larger than the musquash, but has a resemblance to both these animals in its natural habits and in the qualities of the fur.

Until lately this fur was very much used by hat manufacturers, and as many as 600,000 skins have been annually imported from Buenos Ayres and Chili, in which countries the animal abounds. Owing to the wars that continue to be carried on between the different states of Buenos Ayres, and the consequent withdrawal of the trappers from their accustomed occupations, the importations have fallen to 3,000 skins, which are dressed and dyed as a substitute for the costly fur seal.

Hamster (*Cricetus vulgaris*).—About 100,000 of the skins of the hamster are annually collected in Central Germany, where the animal abounds: it has a poor, short, and coarse fur, and is almost exclusively used for cloak-linings by the Greeks: the colour of the back is a reddish-brown, the belly black, with a few light spots. The animal is about 9 inches in length, and lives under ground, forming several apartments for storing grain separate from its own hybernaculum.

It is so industrious and provident that when the peasants go "hamster nesting" in the winter, they possess themselves not only of the skin but of the valuable store of good grain, which is said frequently to exceed two bushels.

Perwitzky.—The skin of this animal is beautifully marked like tortoiseshell, and is brought from the south-eastern territories of Asiatic Russia; the fur is short, giving little warmth, and is chiefly made into cloak-linings, and used by the Russians.

Beaver (*Castor Americanus*).—Beaver skins are imported by the Hudson's Bay Company in less quantities than formerly: the use of the fur in our hat manufactories has greatly diminished since the introduction of silk hats, and a considerable depreciation has taken place in their value. This beautiful fur is sometimes used for articles of dress. In order to prepare the skin for this appropriation, the coarse hairs are removed, and the surface is very evenly cut by an ingenious machine, somewhat similar to that used in dressing cloth. The fur thus prepared has a beautiful appearance, not unlike the costly South Sea otter, and has the advantage of lightness with durability and cheapness.

The white wool from the under part of the beaver still obtains a high price, and is largely exported to France, where it is manufactured into ladies' bonnets. There is no doubt that the beaver was formerly an inhabitant of the British Isles, and Pennant remarks that two or three waters in the principality of Wales still bear the name of *Llyn yr Afanc*, or The Beavers' Lake.

Otter (*Lutra vulgaris*, *Lutra Canadensis*).—The large supply of otter skins used by the Russians and Chinese is derived principally from North America. The quality of the fur is in most respects similar to the otter of the British Isles, of which there are about 500 skins collected annually. This animal has frequently been tamed, and from its extreme agility in the water, has been rendered serviceable in catching fish for the use of its owner.

The American otter is much larger in size than the European, being about 5 feet from the nose to the tip of the tail; a smaller variety abounds in the East Indies, the fur of which is very short.

Sea Otter (*Enhydra marina*).—The sea otter has a very thick, soft, woolly fur, and is most highly prized by the Russians and Chinese, to whom most of the skins are exported. In its habits it is allied to the seal, but has never been met with in large numbers. It is found in the North Pacific, from Kamschatka to the Yellow Sea on the Asiatic coasts, and from Alaska to California, on the American coast.

The annual production is about 1,000 skins, of which 100 are imported into this country by the Hudson's Bay Company.

Seal (*Phoca*).—There are numerous varieties of these animals, some of which are found on the western coasts of Scotland, Ireland, and Wales. They frequent, in immense numbers, the coasts of Newfoundland, Greenland, and Labrador, and the importations into this country frequently exceed 500,000 in one season. The young seals of some species increase in size with great rapidity, and it is asserted by the seal-fishers that they double their bulk in eight days. The greater portion are tanned and enamelled with black varnish for ladies' shoes; other descriptions are well adapted for fur, especially the seal of the South Seas and the north-west coast of America. Before they can be used as a fur, it is necessary to remove the very coarse hairs which cover a beautifully fine and silky fur. The roots of these

hairs are deeply seated in the substance of the thick pelt, while the fur is strongly attached to the upper surface of the skin. By shaving the pelt to half its natural substance, the roots of the coarse hairs are cut through, and they easily fall out; but the same effect is produced by a natural process of fermentation, which ensues when the skins are properly prepared and allowed to remain together. The soft curly fur of the seal is now rarely used in its natural state, but is dyed a deep Vandyke brown, and has the appearance of the richest velvet.

FOX.—Of foxes' skins brought to this country there are many varieties; the black and silver foxes (*Vulpes fulvus*, var. *argentatus*) from the arctic regions are the most valuable. Many of the skins in the Exhibition are worth from 10 guineas to 40 guineas. They are purchased for the Russian market, being highly prized in that country. The cross and red foxes (*Vulpes fulvus*) are used by the Russians, Turks, and Greeks, for cloak-linings and collars. The blue and white foxes are used in this and other countries for ladies' dresses. The white foxes (*Vulpes lagopus*) are represented by arctic voyagers as exceedingly numerous, and migrating in troops over the frozen seas at the approach of the rigorous season. They are easily caught, fifteen having been taken from one trap in four hours.

Wolverine (*Gulo luscus*).—This animal, which is only met with in North America, Norway, and Sweden, is now generally considered by zoologists as identical with the glutton of old writers. It is extremely mischievous to the fur-trader, and will follow the marten-hunter's path round a line of traps extending forty or fifty miles, merely to come at the baits. The fur is generally dark nut-brown, passing, in the depth of winter, almost into black, and is chiefly used in Germany and other northern countries for cloak-linings.

Bear (*Ursus*).—There are several descriptions of bear-skins used by the furrier. The skin of the black bear of North America (*Ursus Americanus*) is used in this country for military purposes, for rugs, and carriage hammer-cloths. In Russia it is frequently manufactured for sleigh coverings, and the skin of the cub bear is highly valued for trimmings and coat-linings. That of the grey bear (*Ursus ferox*) is applied to similar uses. That of the white polar bear, of which the supply is very limited, is frequently made into rugs, bordered with the black and grey bear skins. The fur of the brown or Isabella bear (*Ursus Isabellinus*) has frequently been very fashionable in this country, when its value has been tenfold the present price. It is still considerably used in America for various articles of ladies' dress.

Hare.—The wool or under fur of the European grey hare (*Lepus timidus*) is extensively used for manufacturing felt hats, both in Europe and America. A few of these are dressed for the purpose of being worn as a protection to the chest.

The white hare of Russia and the polar regions (*Lepus glacialis*) was formerly much worn in its pure white state as a lining for ladies' cloaks, and as a substitute for the white fox, but the skin being exceedingly tender, its use for this purpose has been discontinued. The white hare is also frequently dyed: it looks exceedingly rich, but is not very durable.

Rabbit (*Lepus cuniculus*).—The English rabbit, both in its wild and domestic state, affords a very plentiful supply of useful fur. When dressed and dyed in imitation of other skins, it is manufactured into a great variety of cheap and useful articles for the middle classes. The wool has recently been manufactured into a peculiar cloth adapted for ladies' use, but by far the greater number of skins are

still used for hatters' purposes. The English silver-grey rabbit was originally a breed peculiar to Lincolnshire, where great attention was paid to it; but warrens have since been formed in various parts of the country. Skins of this variety are continually exported to China and Russia, where they are much esteemed, and command a comparatively high price. The Hudson's Bay rabbit is beautiful in the length and texture of its fur, but the skin is so fragile, and the fur so liable to fall off with slight wear, that it has little value as an article of dress. The white Polish rabbit is a breed peculiar to that country: its skin is often made into linings for ladies' cloaks, and being the cheapest and most useful fur for that purpose, the animal is imported in great numbers.

Squirrel (*Sciurus vulgaris*).—This attractive little animal abounds in most countries, especially in Siberia and the north of Europe. It is from the Russian dominions that we derive our principal supply of the skins of this agile creature, which exceeds in number that of any of the fur-producing animals. It is said that 15,000,000 are every year captured in Russia, our supply from thence exceeding 3,000,000 annually. The fur of the squirrel, of which there are several varieties, is light, warm, and durable; some of the lighter colours are dyed in imitation of sable. The colour of the Siberian squirrels varies from a pearl grey to a dark-blue grey: the under parts, which are white, are frequently cut out and made into cloak-linings, remarkable for their lightness: the tails are manufactured into boas for foreign markets; they are also extensively used in the manufacture of artists' pencils.

Chinchilla (*Chinchilla lanigera*).—There are two chief varieties of chinchilla, the produce of South America: those from Lima are short in the fur and inferior in quality to those from Buenos Ayres and Arica; the colour is a silvery grey, Arica producing the darkest and best-coloured skins. The general appearance of the animal places it between the squirrel and the rabbit: in its natural abodes it has the agility of the former, and resembles the rabbit in living in holes and burrows. The extreme softness and delicacy of the fur adapt it only for ladies' use. Though much admired and frequently worn in this country, it is more extensively consumed in France, Germany, and Russia.

Raccoon (*Procyon lotor*).—The racoon is an inhabitant of North America: the skins are imported into this country in immense numbers; but meeting with no demand for our home trade, are re-exported by merchants who purchase them at the periodical sales. They are used throughout Germany and Russia for lining shubes and coats, and, being of a durable nature and moderate in price, are esteemed as one of the most useful furs.

Common Badger (*Meles vulgaris*); **American Badger** (*Meles Labradorica*).—The skin of the European badger, from the wiry nature of its hair, is generally used for the manufacture of superior kinds of shaving-brushes; but the skins exported from North America have a soft, fine fur, which renders them suitable for many purposes for which the larger furs are used.

Cat.—In Holland the cat (*Felis domesticus*) is bred for its fur; it is fed on fish, and carefully tended until the fur arrives at its greatest perfection; large numbers are also collected in England and many other countries. The wild cat (*Felis catus*) is much larger and longer in its fur, and is met with in extensive forests, particularly in Hungary; the colour is brownish, grey, mottled, and spotted with black.

The softness and durability of the fur render it very suitable for cloak-linings, and it is also made into wrappers for open carriages and railway travelling.

Canada Lynx (*Felis Canadensis*) ; Lynx Cat (*Felis Rufa*).—The fur of the lynx is long, soft, and of a greyish colour, sometimes, as in the Norway lynx, covered with brown spots ; the belly is white, silky, and not unfrequently spotted with black. The change of fashion has for some time discarded it from this country ; but it is dyed, prepared, and exported in considerable quantities for the American market, where it is much valued and admired. It is generally used for cloaks, linings, and facings, for which purposes it is very appropriate, being exceedingly soft and light.

Furs are subject to injury by several species of moths, whose instincts lead them to deposit their eggs at the roots of the fine hair of animals.

Linnaeus mentions five species that prey upon cloth and furs, of which *Tinea pellionella*, *T. vestionella*, and *T. tapetzella* are the most destructive. No sooner is the worm hatched than it eats its path through the fur, and continues increasingly destructive until it arrives at its full growth, and forms itself a silken covering from which in a short time it again emerges a perfect moth.

Another cause of the decay of furs is the moisture to which they are frequently exposed : the delicate structure of the fine under-fur cannot be preserved when any dampness is allowed to remain in the skin. This fact is well known to the leather manufacturer, who, having wetted his skins, allows them to remain in a damp cellar for a few days for the purpose of removing the hair, which is pulled out with the greatest facility after remaining only one week in a moist condition. It follows from these observations that to preserve furs it is necessary to keep them dry, and to protect them from moths ; if exposed to damp or rain, they must be dried at a moderate distance from the fire ; and when put by for the summer, should be combed and beaten with a small cane, and very carefully secured in a dry brown paper or box into which moths cannot enter. During the summer they should be examined once a month to be again beaten and aired, if the situation in which they have been placed be at all damp. With these precautions, the most valuable furs may be preserved uninjured for many years.

The Jury award Prize Medals to the following Exhibitors in this department :—

BEVINGTONS and MORRIS, King William Street, London (332), for a collection of good and well-manufactured furs and skins, both natural and dyed, of stone marten, baum marten, Kolinsky sable, and ermine.

CLARKE, ROBERT, and SONS, Cheapside, London (307), for a well-assorted collection of manufactured furs in ermine, mink, musquash, grebe, and seal.

CENTRAL COMMITTEE, NOVA SCOTIA (2), for a choice collection of skins, the produce of Nova Scotia, fully described in Illustrated Catalogue, with the names attached to the specimens.

DRAKE, R., Piccadilly, London (306), for three very beautiful muffs made from the choicest skins of the Russian sable, the grebe, and miniver.

EGGERS, F., Moscow, Russia (not in Catalogue), for a fur carpet, well designed, and of good workmanship.

GEYER, J., Pesth, Hungary (346, Austria), for a national cloak called the Bunda, made from Hungarian lamb skins; the tanned leather, which is richly embroidered, forms the exterior of the cloak.

HUDSON'S BAY COMPANY, Fenchurch Street, London (301), for a choice collection of fur skins, the produce of their possessions in North America, consisting of twenty-seven groups, which are fully described in the Illustrated Catalogue, with their scientific names.

KEILICH, HENRY, 9 Butterland Street, Hoxton, London (not in Catalogue), for models of a miniature tigress and cubs, displaying great ingenuity and excellence in design and workmanship, each hair of which is said to have been separately fixed by the hand.

KÖNIG, L., Berlin (139, Prussia), for a camaille of superior workmanship, made entirely from the tails of the mink.

MEYER, M. and S., Bow Lane, London (304), for a variety of manufactured articles, made from the skins of the rabbit, and dyed in imitation of more costly furs, by which a cheap, warm, and ornamental clothing is brought within the means of the working classes.

RUSSIAN IMPERIAL CABINET, St. Petersburg (not in Catalogue), for a pelisse lining made from the necks of the silver fox, for a Russian sable lining, and for skins of the same animal, from Kamchatka.

SMITH, GEORGE, and SONS, Watling Street, London (310A), for an assortment of good and well-manufactured furs, made from Russian sable, North American sable, chinchilla, ermine, and squirrel.

TURKEY, HIS HIGHNESS THE SULTAN OF (1, Turkey), for a large and interesting collection of skins, the produce of Turkey.

WARMING, E., Copenhagen (7, Denmark), for a fur carpet, with stuffed foxes serving as footstools, in which the design and workmanship are in good taste.

WEINKNECHT, T., Brussels (259, Belgium), for two carpets made of fox skins and other furs, beautifully designed; also for a choice collection of other furs.

ZEITZ, J. F., Berlin (841, Prussia), for a coat-lining, made entirely from mink tails, and for a similar article made from the paws of the fisher (*Mustela Canadensis*). Both specimens show great skill in manufacture.

The Jury make Honourable Mention of the following Exhibitors :—

BOLDNER, S. (not in Catalogue), for a fur hearth-rug, representing the Royal Arms of England.

DICK, A., 35 George Street, Edinburgh (311), for a well-manufactured hearth-rug of many pieces of fur neatly and artistically arranged.

HENDERSON, J., Montreal (332, Canada), for sleigh robes and other furs, the produce of the colony.

LIVERPOOL LOCAL COMMITTEE, per T. C. ARCHER (270, Class XXIX.) for specimens of the various skins imported into Liverpool, methodically arranged, and with their scientific names attached. (Awarded a Prize Medal by Jury of Class XXIX.)

Feathers.

The beautiful colouring and graceful forms of these ornaments have always attracted general admiration, which the closest inspection tends only to increase.

Whether our attention is drawn to the soft delicacy of the down of birds, or to the mechanical structure of the pinion feathers, which combine the greater strength with lightness, they are equally interesting and instructive.

The kinds which are used for dress are those of the ostrich, the marabout stork, the rhea or American ostrich, the emu, the osprey, the egrette, the heron, the antrenga, the birds of Paradise, the swan, turkey, peacock, argus pheasant, ibis, eagle, grebe, &c.

The feathers of the ostrich, of which there are several varieties, all varying in texture and quality according to climate and food, are imported into this country from Mogador, Aleppo, Alexandria, and the Cape of Good Hope, and have been used in all ages as ornaments of the head. They formed the plumes of knights' helmets, and were much used by our nobility in the reign of Henry VIII, who himself wore one on state occasions. The black ostrich feathers have been used for many years by the Highland regiments, and at funerals. The feathers in their natural state are still worn by the natives of the Cape of Good Hope, where it is not uncommon to see a waggoner's hat ornamented with them. The perfection to which the art of dyeing has been brought in this country and in France, and the great improvement in their manufacture in other respects, has brought them extensively into wear for bonnets and head-dresses.

Next in request to the feathers of the ostrich are those of the marabout stork, which are of two kinds, white and grey. These are imported into this country from Calcutta in great quantities. They are very much admired for their beautiful texture and extreme lightness, and are used for head-dresses, muffs, and boas. The white kind have at times been so scarce as to be worth their weight in gold.

The feathers of the rhea, or American ostrich, are usually imported from Buenos Ayres. They are used for a variety of purposes by the natives, who dye them of different colours, and form head-dresses and coverings for the body. The flossy kinds are used for military plumes in South America and in Europe, and the long brown feathers of the wing are made into brooms and dusting brushes.

A very graceful plume is made from the feathers of the emu, which are much prized on the Continent, and worn there both of their natural colour and dyed. The feathers of the osprey and the egrette, which are found in various parts of the globe, are chiefly used for military costumes by hussar regiments: those of the smaller egrette, which are the most graceful, are worn by ladies.

The feathers of the Indian heron and the antrenga are much prized on account of their scarcity, and are frequently worn by eastern princes.

Birds of Paradise, which are imported from the Manillas, have in all ages been in great request as ornaments both for men and women, and were formerly very rare. They are favourite decorations for the Turkish turban, and it will be remembered that they were worn by the Nepaulese princes when in this country.

The feathers of the common cock are also used for ladies' riding hats and for military plumes. The greater part are imported from Hamburg. The down of the turkey, the swan, and the goose, is made into plumes, muffs, and tippets; and from the feathers of the ibis, wreaths and trimmings are formed, which are much admired for the brilliancy of their colours.

The manufacture of feathers gives employment to a great number of females,

and is principally confined to England and France, although of late manufactories have been established at New York for goods suitable for that country.

The Jury award a Prize Medal to the undermentioned firm :—

ADCOCK and Co., 3 Princes Street, Cavendish Square, London (323A), for an admirable collection of the most beautiful kinds of feathers, manufactured and dyed for ornamental purposes.

The Jury desire to make Honourable Mention of the following Exhibitors :—

BOOTH, J. P., Cork, and 80 Hatton Garden, London (112), for various articles of ladies' dress, made from turkey-down and feathers.

FOSTER, SON, and DUNCUM, 16 Wigmore Street, London (74, Class XXIX.), for a handsome muff and boa of marabout feathers.

HENOC, 1 Rue St. Sauveur, Paris (261, France), for screens and feather-brooms made of ostrich, peacock, and other feathers.

L'HUILLIER, E., 86 Rue St. Martin, Paris (1325, France), for various kinds of feathers for ornamental purposes, head-dresses, cloaks, screens, &c.

LODDE, A. A., 50 Rue Bourg L'Abbé, Paris (1329, France), for plumes of feathers, and screens of various kinds.

PERROT, PETIT, and Co., Rue de la Bourse, Paris (852, France), for two rare and magnificent Persian heron plumes and other fancy feathers for dress. (Awarded a Prize Medal by Jury of Class XXIX.)

TOLLET, GEORGE, Betley Hall, Staffordshire (154, Class XX.), for tippetts, cloaks, victorines, and muffs made from goose-down and feathers : a manufacture established with the view of giving a new employment to needle-women.

Artificial Hair.

The material for this trade, which gives occupation to a large number of manufacturers and workmen, is procured from the north of France, Belgium, and Germany, and some of good quality is occasionally brought from Ireland. The lighter-coloured hair, which bears the highest value, is the production of Germany ; the darker shades are imported from France. The wholesale price varies from 30s. to 60s. per lb., and occasional rare specimens are of much higher value. A head of hair, such as is bought of the peasant girls in the districts before named, weighs from 1½ to 2 of a lb., and is usually exchanged for trinkets or articles of dress.

The Jury, after carefully examining all the specimens contributed by various exhibitors, have selected the following, of which to make Honourable Mention, as the most suitable recognition of the general equality in style and excellence displayed in these productions :—

BOUCHET, C., 74A New Bond Street (246), for specimens of the new crochet-work in wig making, on skin and on net.

BROWNE, F., 47 Fenchurch Street, London (245), for head-dresses of ornamental hair.

CARLES, H. R., 45 New Bond Street, London (251), for wigs and head-dresses.

CAUSSE, D. A., 267 Regent Street, London (259), for perukes and head-dresses.

CROISAT, J., 76 Rue de Richelieu (1574, France), for perukes without toupees, produced by machinery.

ISODORE and BRANDT, 217 Regent Street, London (253), for wigs, perukes, and other works in hair.

ROBEY, W., Richmond, Surrey (262), for ladies' head-dresses.

TYZACK, W. V., Norwich (264), for specimens of manufacture in false hair.

THIERGERE, 4 Rue Vide Gousset, Paris (695, France), for perukes and ladies' fronts.

WINTER, W., 205 Oxford Street, London (249), for wigs and head-dresses.

The Jury are much indebted to Mr. NESBITT, Wigmore Street, to Mr. JENNINGS, Quadrant, and to Mr. DALLING, Old Bond Street, for their valuable assistance in the examination of the various manufactures in artificial hair.

Woven Hair for Furniture, and other purposes.

Hair used for weaving consists of the long hair from horses' tails. It is procured principally from South America and from Russia. All the black and grey hair is dyed for the manufacture of black hair-cloth for covering furniture. White only can be dyed so as to produce what are called fancy colours, such as green, claret, crimson, scarlet, &c., and great care is required in the process, which, however, when well managed, produces good permanent colours.

The quality of the cloth, as well as the brilliancy and permanency of the colours, depend also in a great degree on the nature of the warp, which may be either of cotton, linen, or worsted. Coloured hair-cloth (principally manufactured at Worcester, Sheffield, and Paris), has been extensively used in the fitting up steam-vessels, and for covering chairs, sofas, railway carriages, &c. Some of the lighter colours have also been used for boys' caps, slippers, &c.

In the manufacture of hair-cloth the weaver uses a sort of hook-shuttle, which he passes between the threads of the warp, or shed, towards his left hand; the assistant, or "server," places a single hair over the end of the hook, and the weaver draws it through the warp. This operation is a tedious one, and the hairs being necessarily placed in singly, prevents the application of machinery, which is so advantageously used in fabrics where the shoot or weft consists of a continuous thread.

In this department, the Jury award Prize Medals to the following Exhibitors:—

DELACOUR, H. P., 47 Rue Vieille du Temple, Paris (472, France), for horse-hair and "vegetable silk" damask.

FORRER, A., 136 Regent Street, London (99, Class XXIII.), for ornaments worked in hair and gold.

HAUSSENS-HAP, B., Velverde, Brussels (257, Belgium), for horse-hair fibre stuffing for furniture, and other manufactures in hair.

LATCOCK and SONS, Sheffield (330), for horse-hair damask, &c., of superior manufacture.

LEMONIER and Co., 1 Rue de Coq St. Honoré, Paris (909, France), for ornamental hair-work.

WEBB, E., Worcester (243), for coloured hair-cloth and cloth composed of silk and hair; also for horse-hair carpets, woven in the same manner as Brussels carpets. In all these articles great excellence of manufacture has been attained.

WISDOM, RUSSELL, and WHITMAN, Cleveland, Ohio, America (205, United States), for superior specimens of curled hair for furniture.

Leather.

An exhibition of the various descriptions of leather brought from every country, affords an opportunity of comparing the peculiar qualities and excellences of each, which must be highly instructive both to manufacturers and artisans. Many of the improvements in this branch of trade have been introduced from other countries, where they have originated in causes purely local: thus, Russian leather, so much esteemed for its scent, is tanned with the cheapest bark of the country, and softened with an oil extracted from the bark of the birch tree, also abundantly produced; the combination of these materials gives the scent and qualities so highly valued in Russian leather. The peculiar softness in French curried leather is in part attributable to using the bark of the evergreen oak, with which the better descriptions are tanned; and the sole leather of England, which is not surpassed by any leather of its class, is dependent, to some extent, upon the superior oak bark that abounds in our island.

The bark of the oak tends to give firmness and solidity, while other sorts are remarkable for the softness they impart to the leather; and each material used in tanning gives some distinct quality in respect to colour, scent, toughness, or capability of resisting moisture and decay.

Experience shows that the tanning principle in different combinations is found in the bark and leaves of many trees; and it is to be expected that an extended comparison of the various descriptions of leather, for the first time brought together, will be the means of suggesting many improvements.

Chemistry has hitherto done less in this branch of manufacture than might have been expected. Though numerous experiments have been tried, and many patents granted for new processes, there has been no decided improvement, no marked progress, to show that better results have been obtained than by the old methods of tanning.

Very much has, however, been effected by mechanical means during the last 50 years. The steam-engine has been generally introduced into the manufactories of the leather-dressers and tanners. It is used in grinding bark, for softening foreign hides, and in giving motion to many machines for washing, glazing, and finishing leather. But the most important results have arisen from the invention of very ingenious machinery for splitting hides and skins. These machines completely separate the upper from the under surface, leaving each part of the same superficial dimensions as the original hide. This is effected by means of a long sharp knife, kept in rapid motion about the sixteenth of an inch from the edge of a smooth bar of iron, over which the skin is drawn by a revolving cylinder. By another machine the skin is pressed between two revolving rollers, and presented, as it emerges, to the edge of a long straight knife, which is nicely adjusted between the upper and under surface of the skin, and kept in motion backward and forward to facilitate the operation of splitting. These machines are now common in most of the leather manufactories of England, and in some of the most important establishments on the Continent.

The hydraulic press is found to be a very useful auxiliary for expressing the

grease from sheep skins; it enables the leather manufacturer to dye more brilliant colours, which cannot be well done while any grease remains in the pores of the skin. By these appliances the tanners and leather-dressers are enabled to produce a more perfect and a cheaper article. The improved facilities of transport, the abolition of excise duties, and the greater freedom of our commercial relations with other countries, have all tended to the same desirable result.

We proceed to give a short account of several descriptions of skins used for tanning and leather-dressing; specimens of which are met with both in the English and Foreign sections of the Exhibition.

Horse.

Horse hides are brought into this country in large numbers; the principal supply is from South America, from whence 180,000 were imported last year. The horse was unknown in South America previous to the occupation of the country by the Spaniards; it now runs wild over the flat plains of that country, and is caught for the value of its hide and hair. These skins are usually appropriated for ladies' shoes, either as cordovan or enamelled leather; for the latter purpose, the hide is split by a machine described in another part of this Report. The price of these hides varies considerably; at the present time the value is very low, not exceeding 4s. 6d. each.

Ox, Cow, and Calf.

Ox and cow hides are produced in very large numbers in the British Isles; they are usually tanned in oak bark, and appropriated for sole-leather, as well as for harness, machinery, and coachmakers' use. Foreign hides, which are imported largely from the East Indies, South America, and the Cape of Good Hope, are similarly appropriated. The latter description, like most of the skins from that fertile colony, are large, thick, and well grown. A remarkable specimen of the horns of the Cape ox, measuring more than 8 feet across, are exhibited in the department appropriated to Cape produce. The calf skins of England are very generally tanned in oak bark, and used for the upper part of boots and shoes. Foreign calf skins are imported from the ports of the Baltic, where they are killed much younger than in this country, and are used for bookbinding, for gloves, and ladies' shoes.

Hippopotamus.

About 100 of these hides have been annually imported into London from South Africa; they have been tanned in oak bark, in which state they make exceedingly thick and compact leather: no very suitable application has yet been found for them.

Deer.

Deer skins produced in this country are manufactured into oil or chamois leather, and appropriated for gloves, breeches, boots, and braces. A very large number are annually collected in North America, and manufactured in the United States. A small portion of these skins are used in this country and in Germany. The hair of the deer is said to be the best material for stuffing saddles.

Hog.

Hog skins are collected and tanned almost exclusively in Scotland, where it has long been the custom to strip the skin from the carcase of the animal, contrary to the practice in this country and in Ireland. The leather is porous and light, but extremely tough and strong on the grain or outer surface. When tanned and curried, it is sold to harness-makers for covering saddles, for which purpose it is peculiarly adapted. The wild boar is remarkable for the extreme thickness of its hide on the back and mane, which enables it to break through the thorny brushwood of the forests with facility. A specimen of this part of the skin is exhibited by Mr. GEO. EDWARDS, which is more than two inches in thickness, and took seven years to complete the process of tanning.

English Sheep and Lamb Skins.

The immense supply of English sheep skins affords occupation to many large establishments, in which they are manufactured and variously coloured similar to morocco leather. They are tanned in bark for bazils, in alum and salt for white leather, and are also largely appropriated for parchment and chamois leather. The principal places where these skins are dressed and dyed are Bermondsey, Leeds, and Manchester, whence they are exported to Germany, South America, and our own colonies. A considerable quantity are also sent to the United States, after being partially prepared and salted. The value of an English sheep-pelt varies from two to ten pence, when the wool of the same skin may be estimated from two to ten shillings; hence the attention which is paid to the latter, while the former is entirely neglected. In proportion to the fineness of the wool, the compactness and value of the pelt are depreciated. The supply of sheep and lamb skins annually produced in London and its vicinity exceed a million and a half: a large portion of these are split; the upper surface is tanned with sumach; the lower half is manufactured into parchment and chamois leather. Of lamb skins, the grain or upper surface is frequently made into white leather for tying over the stoppers of chemical bottles; the flesh, or lower surface, is dressed into thin chamois leather for lining gloves.

Cape of Good Hope Sheep.

A very distinct variety of sheep skin is imported from the Cape of Good Hope; the wool is short and coarse, and rarely produces more than 1 lb. per fleece. This sheep has a tail of extraordinary thickness, frequently as large as the neck of the animal, and loaded with fat. Though the wool is of no value to the Cape farmer, this animal is still preferred by some flock-masters in consequence of the superior quality of the meat, the large quantity of fat produced, and the hardy constitution of the sheep, which appears to be particularly adapted to the climate. A similar sheep skin with broad tail is also imported from Smyrna; but on this the wool is of finer quality. When manufactured into leather, the quality of the Cape sheep skin is found to be nearly equal to morocco leather: it is frequently dressed for tan driving gloves, and produces a very serviceable and durable article.

Foreign and English Lamb Skins for Gloves.

In Italy, Spain, and the south of France, it is the custom to kill the lamb at a much earlier period of its growth than is usual in England; the skin is in consequence small, fine, and thin, and is used as a substitute for kid: the leather, however, is neither so strong nor so glossy on the surface, but sufficiently soft and elastic, and largely manufactured into gloves in the counties of Somerset and Worcester. About 1,400,000 lamb skins are annually imported for this purpose. Those of the highest value are brought from the vale of the Arno, in Italy; they are also imported from Turkey, Austria, Spain, and France. Small English skins, which are taken by the shepherds from the lambs that die within a few days of their birth, are frequently dressed with the wool, and appropriated for lining gloves and shoes. About 400,000 of this description are annually collected, and a portion of them are manufactured into coloured leather gloves.

Swiss Goat Skins.

The goat is reared in considerable numbers in Switzerland, Italy, and the south of France, for the valuable milk which it supplies. The skins are preserved with great care, and exported to this country for the purpose of making into morocco leather. Those from Switzerland bear the highest value, on account of the perfect nature of the grain of the skins, which enables the morocco manufacturer to dye them very brilliant and permanent colours. The texture of goat skins is very strong, and more durable than the sheep; from which circumstance they are well adapted for covering chair-seats and lining carriages. About 96,000 are annually imported from Switzerland and the valley of the Rhine.

Cape Goat Skins.

Skins of the Cape goat are much thicker than any other kind, and are applied to purposes where great strength and substance are required. The body of the animal is as large as the fallow deer. Many of the skins are exported to Germany, where they are manufactured into leather for the common dresses of the peasantry.

Mogadore and East Indian Goat Skins.

Mogadore goat skins are distinguished by the great length of the hair, which, when shorn from the skin, is curled and manufactured for stuffing chair-seats and mattresses. The skin is rather inferior in quality, and usually made into black morocco, which from the circumstance of our first supplies having been derived from Spain, still retains the name of black Spanish leather.

East India goat skins are small in size and extremely short in the hair: they are appropriated for ladies' shoes, and occasionally dyed for covering chair-seats.

Kid.

Kid skins are collected in the south of France, Germany, Switzerland, Italy, and Ireland. French skins are the most perfect, and of the finest quality; those from Ireland, of which there are 60,000 skins annually exported, are also highly valued. East Indian kid skins are adapted for light shoes, but are occasionally made into gloves. As soon as the kid begins to feed on herbage, the fineness and delicacy of the skin is injured, and it becomes unsuited for the best gloves; it is then used for

shoes, braces, and binding-leather, for which purposes it is well adapted on account of its great strength and elasticity.

Seal.

The seal has been already mentioned among the fur-producing animals; the particular species whose skins are manufactured into leather are found in great numbers on the shores of North America, from Newfoundland to the Arctic Ocean. As many as 600,000 have been caught in one season, and a large fleet of vessels is employed in this trade. The oil which the animal produces is the principal inducement to its capture; but the skin, which is worth from 3s. to 4s., forms no inconsiderable sum when estimated upon the large numbers that are brought to this country. The seal, when young, has long, white, silky hair, which it sheds in a few weeks, and becomes covered with hair of a coarser and darker colour. In the latter state it is best adapted to the purposes of the leather-dresser. When carefully manufactured, the skin has greater strength in proportion to its substance than any leather that is usually worn. It is generally made into black enamelled leather for ladies' shoes, and is much used for shoe-binding where great strength is necessary. From experiments tried on seal, porpoise, and whale leather, that are exhibited in the Canada department, it appears probable that the skins of the marine mammalia have greater strength than those of land animals.

Skins and furs in the undressed state are liable to be eaten through by the grub of a small beetle (*Dermestes vulpinus*). The eggs are generally deposited in some crevice about the head of the skin. These produce a swarm of hairy grubs, which feed upon the pelt, and grow to the size of small caterpillars. Instances have been known where the entire value of a foreign package of skins has been destroyed by these insects, and the annual loss occasioned by them in this country is computed to be from 2,000*l.* to 5,000*l.* They are found to be most destructive when skins are packed in midsummer or autumn, at which season the insect flies abroad and deposits its eggs unperceived as the skins are drying in the air. The collections of skins packed in spring and winter are not liable to this injury. Camphor and tobacco leaves have been tried against the depredations of this insect, and each has been attended with some success, but not so entirely as to recommend either of them as a complete preventive.

Rough Tanned and Sole Leather.

The number of exhibitors in this subdivision is 53, of whom 15 are in the English department, 9 in the French; and 29 in other sections of the building.

The sole leather in the English department has for the most part been tanned with oak bark, but we notice some varieties in the collection of Messrs. BOUTCHER, MORTIMER, and Co., and in the Australian division, in both of which there are specimens that have been tanned with mimosa bark. The Hon. Z. PRATT, of Prattsville, New York, exhibits leather tanned with the bark of the hemlock tree: several exhibitors have employed valonia as a principal ingredient. In the New Zealand collection there are some remarkable varieties; and in the Russian department we find specimens said to be cured with rye.

Although many vegetable extracts have been discovered which are useful in

tanning, inasmuch as they shorten the process and economize the cost of production, yet no material has yet been found which combines so many valuable qualities as oak bark for tanning sole leather; it fills more completely the pores of the hide, and prevents the great absorption of water to which leather tanned with other material is liable.

The simplest method of tanning sole leather, still practised in some of our colonies, is to shave the hair from the hide with a sharp knife, and to steep the pelt in bark liquors for a year; by which time the gelatine of the hide has chemically united with the tannin, and the process is complete. In England it is customary to remove the hair by immersion in lime water; if this process is carried beyond the proper point it dissolves too much the soluble gelatine, and renders the leather porous.

Since the abolition of duties on tanned hides and skins, a considerable increase has taken place in the importations from foreign countries, with obvious advantages to the foreign manufacturer and English consumer. Both curried and varnished calf leather of excellent quality are brought from France, Germany, and Switzerland, and large numbers of curried boot fronts. From Australia and the East Indies arrivals of tanned leather are more frequent, and supply at moderate prices the increasing wants of the community. In many cases the economy of tanning on the site of produce is considerable: the labour and tanning materials are both procurable at less cost; much is saved by the diminished freight of the manufactured article; and the leather is less liable to damage by moth and worm, to which untanned skins are exposed in their passage to this country.

As many beautiful and well-manufactured leathers have come under the notice of the Jury, which have been exhibited by proprietors, or by those who have only to a small extent superintended the manufacture, the Jury have recognized the merit of these productions by including the exhibitors with those manufactures whom they consider entitled to Honourable Mention.

The Jury award Prize Medals to the following Exhibitors:—

COX, W. H. and Co., Russell Street, Bermondsey, London (293), for two foreign butts very well tanned.

CRAWFORD, H. M., Philadelphia (51, United States), for calf skins tanned in oak bark.

DRAPER, R. and H., Kenilworth (293), for a remarkably heavy and well-tanned English hide, weighing 90 lbs.

DUPORT, V., 16 Rue des Francs Bourgeois St. Marcel, Paris (182, France), for three split hides of twice the usual length. The increase of surface is ingeniously obtained by a peculiar mode of splitting. A machine divides the hide into two surfaces, commencing at the neck and continuing nearly to the opposite extremity; where the splitting terminates, the hide is neatly cut to preserve a uniform thickness, and when opened out extends from 17 to 18 feet.

FIEUX and Co., Toulouse (210, France), for well-manufactured sole and harness leather.

HEPBURN, JOHN and THOMAS, Long Lane, Bermondsey (293), for an English crop butt, of good substance and texture, and well tanned in every respect.

LANDRON, BROTHERS, Meung-sur-Loire (1639, France), for well-tanned sole leather.

PELTEREAU, AUGUSTE, Chateau Regnault, Indre-et-Loire (677, France), for sole leather of excellent quality, tanned by two methods.

PELTEREAU, F., jun., Chateau Regnault, Indre-et-Loire (949, France), for sole leather of excellent quality, tanned in oak bark, some of the specimens have been tanned without the usual application of lime.

The Jury make Honourable Mention of the following Exhibitors :—

BEAUCHAU DE BARÉ, A., Namur (262, Belgium), for tanned hides, applicable for soles and pump buckets

BOUTCHER, MORTIMORE, and Co. (293), for tanned sole leather.

BUCKNALL, GEORGE (293), for tanned hippopotamus hides of remarkable thickness

BUSCHMANN, J. W., St. Vith (386, Prussia), for well-manufactured sole leather.

ESTIVANT, BROTHERS, Givet, Ardennes (1214, France), for a Buenos Ayres hide, tanned in oak bark.

EVERSHED, SUSSEX, (293), for well-tanned light sole leather.

HAUSER, J. de J., Waedenschwyl, Canton Zurich (172, Switzerland), for a specimen of sole leather, tanned in oak bark.

HOLMES, T., Hull (16), for specimens of the tanned hide of the walrus, and polishing wheels covered with the same; also for stuffed heads of the male and female walrus, taken at the Davis' Straits fisheries.

KELSEY, J. T., Lingfield, Sussex (266), for a well-tanned crop hide, weighing 82 lbs. The process of tanning occupied two years.

MASSON, CHARLES, Huy, (267, Belgium), for tanned sole leather of good quality.

Curried Leather.

Leather, having been first tanned and dried, requires to be reduced to an even substance, to be well extended, and made supple with fat or oil, before it is fit for the upper part of boots. In the latter operations consists the art of the currier, and although much of the strength of the leather depends upon the previous treatment, still great attention and judgment are required to conduct this process perfectly. No article enters more generally into the consumption of the affluent and labouring classes; and it is evidently a subject of some importance to adopt those methods of currying which secure the greatest suppleness of leather, combined with durability.

The manufacturers of France have, for many years, excelled in their mode of tanning and currying the finest descriptions of calf leather: those from the south of France (Bordeaux calf), which are reported to have been tanned with the bark of the evergreen oak, are extremely soft and pliable, and their merits are obvious from the extensive sale they meet with in this country. The mode of tanning and currying pursued by the English exhibitors is adapted to bear exposure to wet, and great improvement has taken place in the method of rendering the leather soft and easy to the wearer. The Swiss exhibitors have shown some very excellent leather of this class, for the upper parts of boots and shoes.

There are upwards of 70 exhibitors of curried leather, of whom 20 are in the French division, 13 in the English, and the remaining 44 are distributed through every section of the Building.

The Jury award Prize Medals to the following Exhibitors :—

BOSSARD, I., Church Street, Bermondsey, London (294), for curried calf leather of superior qualities, combining great strength with softness and pliability.

COURTÈPÉE-DUCHESNEY, 11 Rue du Renard, St. Sauveur, Paris (806, France), for boot-fronts, very pliable, and of good quality, principally manufactured from the calf skins of Paris.

COZENS and GREATREX, Walsall, Staffordshire (283), for tanned and curried leather, adapted for bridles, and for well-manufactured hog skins.

DEZAUX-LACOUR, Guise, France (167, France), for curried calf skins and well-tanned sole leather.

GUILLOT, J. A., 17 Rue du Boulay, Paris (534, France), boot-fronts of various kinds, very well manufactured.

HEMSWORTH and LINLEY, West Smithfield, London (20), for boot-fronts, and cordovan of excellent quality and workmanship.

HERRENSCHMIDT, G. F., Strasbourg (538, France), for boot-fronts, and curried calf skins, soft in texture.

JETU, C. A., Quebec (109, Canada), for curried porpoise leather, and samples of leather from the skin of the whale; the porpoise leather is of fine texture and considerable toughness, and is remarkable as the first of the kind exhibited in this country.

LAMBERT and SON, Bermondsey New Road, London (63), for waxed calf skins boot-fronts, and cordovan, of good qualities and workmanship.

PRIN, A., Jun., Nantes (141, France), for russet and black curried calf leather, well manufactured.

MERCIER, J. J., Lausanne (175, Switzerland), for curried calf leather, boot-fronts, and chamois leather, well manufactured for the purposes to which they are applicable.

MERKLINGHAUS and WEX, Barmen (672, Prussia), for dressed hides manufactured for saddlery and harness.

SKVORSOFF, M., Moscow (232, Russia), for curried calf leather of good quality, and a few calf skins tanned and curried, with the hair attached as an inside lining for the boot; extremely soft and pliable.

STOCKIL, W., 33 Long Lane, Bermondsey, London (17), for specimens of boot-fronts, very well curried from the English leather.

SCHER, H., Nantes, France (1022, France), for a good assortment of curried calf leather and foot-fronts.

VENTUJOL and CHASSANG, 21 Rue des Gobelins (1384, France), for boot-fronts manufactured from Bordeaux calf skins, remarkable for peculiar softness, fineness of texture, and the great toughness of the material.

The Jury make Honourable Mention of the following Exhibitors :—

BUDIN, R. A., Rue du Fer à Moulin, Paris (77, France), for curried horse hides, suited to the upper part of boots and shoes.

BUSE, N., Swansea, Wales (4), for curried calf leather, well manufactured.

FORTIER BEAULIEU, Rue de la Lunette (510, France), for curried leather suitable for harness and saddlery.

GHISLAIN-DUBOIS, Binche (469, Belgium), for cow hide curried for strap leather.

HOGARTY BROTHERS, Cork, Ireland (13), for curried calf leather and boot-fronts, very well manufactured.

MASSEMIN, C. L., Rue de la Reynie, Paris (1345, France), for calf leather adapted for boot-fronts.

OBERCONZ, H., Trèves (383, Prussia), for curried leather and for a well-tanned hide, a perfect imitation of Russian leather.

PAILLART BROTHERS, Rue du Grand St. Michel, Paris (338, France), for calf and sheep leather manufactured for straps and rollers.

REULOS, A. J., 13 Rue Geoffroy, St. Hilaire, Paris (1434, France), for curried horse leather, adapted for boots and shoes.

SOUTHEY and CO., Lincoln's-Inn Fields, London (51), for an extensive assortment of good leather, manufactured for coach and harness makers.

TAILLET, V., Brussels (254, Belgium), for boot and shoe leather, well manufactured.

WOOD, W. and S., 32 Bow Street, London (25), for a well-manufactured assortment of calf skins, curried and dyed in imitation of Morocco leather.

Varnished Leather.

Varnished and enamelled leather has been brought to great perfection during the last 25 years, and increases in general demand as the improvements in its manufacture become generally known. Though the difficulty of making a bright varnish adhere to leather which is required to bend freely, and retain an unbroken surface, is considerable, it has been successfully overcome by the use of boiled linseed oil, mixed with vegetable black and Prussian blue to deepen the colour. This composition (the consistence of a thick paste) is rubbed on to the surface of the leather by hand, and dried in a stove heated to 150 and 170 degrees Fahr. The operation is repeated from three to seven times, according to the nature of the leather, and when the varnish is thoroughly dry, it is found to adhere very firmly, and to bear considerable tension without fracture.

Many coloured pigments are mixed with the varnish, without materially altering its tenacity: by this means the most brilliant colours are produced, and the leather is rendered more applicable for ornamental purposes.

The number of exhibitors in this branch of the leather trade is thirty-three, of whom nine are German, seven French, four English, and thirteen from other countries.

Prize Medals are awarded to—

COURTOIS, E., 12 Faubourg Montmartre (1571, France), for black and coloured varnished calf hides, brilliant on the surface, and well manufactured.

DEADÉ, J., 18 Boulevard de Charonne (813, France), for a large assortment of well-manufactured calf and cow hides, adapted for shoemakers and coach-manufacturers.

DIXON and WHITING, Bermondsey, London (290), for an assortment of varnished and enamelled hides and splits, adapted for coachmakers, &c. In this collection the practicability of splitting three surfaces from one hide, is shown by the exhibition of the three parts separately tanned and varnished.

DOERR and REINHARD, Worms (33, Hesse), for a good assortment of varnished calf leather for shoemakers.

GAUTIER, J., 4 Faubourg Montmartre, Paris (1244, France), for black and coloured varnished calf leather, on which the enamel is brilliant, and the leather sufficiently pliable.

HEINTZ and FREUDENBERG, Baden (282, Prussia), for black varnished calf leather, on which the enamel is strong and brilliant.

HEYL, C., Worms (32, Hesse), for varnished calf leather of excellent quality.

HOVETTE, A., and Co., 46 Rue du Fer à Moulin, Paris (1271, France), for a superior assortment of black and coloured varnished calf leather.

JOREZ, jun., Brussels (306, Belgium), for a white varnished hide of superior quality, and for well-manufactured curried leather.

MAYER, MICHEL, and DENINGER, Mayence (36, Hesse), for japanned and varnished hides, and calf leather, and for moroccos, roans, and skivers, dyed in great variety of colour. These exhibitors also show curried leather for harness, and other purposes. Each description of leather has been well manufactured.

NYE and Co., 132 Faubourg du Temple, Paris (1373 France), for black varnished calf leather, manufactured very perfectly for boots and shoes. The varnish is brilliant, and sufficiently strong and elastic to bear the bend and strain to which it is liable.

OASTLER and PALMER, Bermondsey, London (286), for a large assortment of enamelled and varnished leather for coachmakers, and for a very well-tanned crop butt.

The Jury make Honourable Mention of the following Exhibitors:—

HALL, Sydney, New South Wales (not in Catalogue), for enamelled kangaroo skins, manufactured for boots and shoes.

MAYER, IGNAZ, Munich (46, Bavaria), for varnished calf and very good enamelled coach hides.

MINOPRIO and HOHWIESNER (37, Hesse), for varnished calf and coloured japanned hide.

ROTH, C. W., Frankfort (9), for varnished calf leather.

VIGNEAU, L. J., Barcelona (249A, Spain), for varnished calf leather, suitably manufactured for boots and shoes.

Morocco and Dyed Sheep-skin Leather, &c.

Morocco and dyed sheep-skin leathers are represented by thirty-one exhibitors from Paris, London, Leeds, Mayence, Barcelona, Tunis, and Turkey. This description of leather is tanned with the leaves of the sumach tree (*Rhus coriaria*), imported into this country from the island of Sicily. Great excellence has been attained in the manufacture, both in the brilliancy and variety of colours, especially when it is considered that neither strong acid, nor great heat, can be applied without danger of destroying the fibre of the leather.

The specimens of morocco from Turkey, Tunis, and Egypt, show the manufacture in its origin, and no alteration appears to have taken place in the mode of dyeing, &c., since the period when western Europe was indebted to them for this manufacture. The red morocco of Turkey and Egypt is brilliant and permanent, and though well suited for their particular use, is not adapted for general consumption.

BEVINGTONS and SONS, Neckinger Mills, London (No. 1), exhibit an assortment of morocco leather, enamelled seal skins, Cape sheep, kid, and gloving leather, and a series of the materials used in tanning and leather-dressing, to illustrate the several modes of curing and tanning practised in this country. They also exhibit skins in the unmanufactured state, and a Macedonian lamb skin divided to show the natural laminations by which the epidermis, the rete mucosum, and cutis, are easily distinguished.

The Jury award Prize Medals to the following Exhibitors:—

BAYVET BROTHERS and Co., 16 Rue Mauconseil, Paris (415, France), for an assortment of morocco, roan, and calf leather, finished with great regularity, and in a variety of beautiful colours. The cochineal red and the various shades of green morocco, are remarkable for the fulness of colour. The black morocco is also of good quality.

EMMERICH and GOERGER, Strasbourg (1212, France), for a good assortment of coloured and black morocco, well dyed and manufactured.

WILSON, WALKER, and Co., Leeds (11), for a very large assortment of coloured sheep, morocco, and calf-leather, well manufactured, and adapted, from their price, for general consumption.

The Jury make Honourable Mention of the following Exhibitors:—

DAVID, C., 12 Rue Mauconseil (812, France), for a beautiful collection of dyed morocco for bookbinding.

DELISLE and Co., Grenoble (1181, France), for specimens of sheep and morocco leather, printed in permanent colours, for furniture, &c.

DEED, J. S., Little Newport Street, London (10), for a good assortment of morocco leather for furniture and bookbinding.

EAST and SON, Bermondsey, London (34), for dyed and embossed sheep leather, in imitation of Utrecht velvet. This appears to be a good appropriation of leather, which is imperfect in the grain, and is manufactured with skill and good taste.

GEORGE, CLEMENT, 102 Dean Street, Westminster (32), for good specimens of morocco and Russian leather, adapted for furniture and bookbinding.

GEORGE, JOSEPH, 81 Dean Street, Westminster (289), for specimens of leather, beautifully gilded, embossed, and painted.

GIRAUD BROTHERS, Paris (850, France), for dyed morocco and sheep leather, in brilliant and permanent colours.

LUTWYCHE and GEORGE, Skinner Street, London (53), for well-manufactured morocco leather and dyed sheep-skin rugs.

ROGO, SALVADOR, Barcelona (249B, Spain), for an assortment of morocco leather dyed in a variety of colours, for shoes; and for well-manufactured black morocco.

Alum and Gloving Leather.

Alum or white leather is manufactured principally for the purposes of the glove-maker, and is represented in the Exhibition by twenty contributors.

The common method of making this description of leather is to immerse the prepared skin in a solution of alum and salt, in equal proportions; but where elasticity and softness are required, as for kid gloves, very much care and attention are necessary. The skin having been first softened in lime-water, has to be many times washed, and worked in pure water, and afterwards in fermented bran-liquor. Yolks of eggs, flour, alum, and salt are the materials with which the skin is made into soft leather: and it is then dried, worked over a round blunt knife, and after a second washing and softening with yolks of eggs, it is ready to receive from the dyer the beautiful colours so well known to the public in the manufactured article of gloves. It has been estimated that 6,000,000 of eggs are annually consumed in the glove-leather manufactories of France and England.

A few specimens of the excellent kid leather of France are exhibited by M. JOUVIN, of Paris: these skins are manufactured at Annonay, a town about fifty miles south of Lyons. The great superiority of the manufacture of this place is very remarkable, and a very large portion of the kid skins from every quarter of the globe are sent thither to be converted into gloving leather. Though the supply is derived principally from the adjacent provinces of France, from Italy, Switzerland, and Germany, yet Ireland and the East Indies have of late years contributed no inconsiderable quantity. The total number annually manufactured there is not less than 4,000,000 skins.

It is worthy of remark, also, that a very large portion of the lamb skins, suitable for gloving leather, are sent from many countries to be manufactured at Yeovil, in Somersetshire, and the adjacent neighbourhood. It is not unusual to see in that place the lambs' skins of Italy, Austria, Spain, Turkey, Denmark, Bordeaux, Buenos Ayres, and the Cape of Good Hope. The climate and the peculiarities of water, which are so admirably adapted for kid leather-dressing in France, are unsuited to the proper manufacture of lamb skins, which require a more temperate climate and other facilities of manufacture, which are met with in England.

The following Exhibitors have been awarded Prize Medals:—

BARRANDE, J. P., Rue du Fer à Moulin, Paris (756, France), for an assortment of dyed goat, sheep, calf, and kid leather, in variety of colours. The bronze colour of this manufacturer is excellent and durable; and the softness of the alumed calf leather renders it admirably adapted for the upper part of boots.

CORRY, J. and J., Queen's Camel, Somersetshire (314), for Italian lamb skins, dressed and dyed in a variety of colours, for gloves.

LOLAGNIER, —, 6 Rue St. Hippolite, Paris (1330, France), for specimens of kid, lamb, calf, and sheep leather, suitably manufactured for gloves.

The Jury make Honourable Mention of the following Exhibitors:—

BOULOGNE, P., Prague (344, Austria), for kid and lamb-skin leather, dressed for gloves, in which the smoothness and strength of the grain have been well preserved.

LUXEMBURG GLOVE MANUFACTORY (4), for bronze and black kid leather, and for specimens of dyed kid and lamb leather, for gloves.

MATTAT and SONS, Randers (10, Denmark), for very well-dressed leather, both for white and tan-coloured gloves.

RANNIGER, J. L. and SON, Altenburg (Prussia, 741), for an assortment of lamb leather, dyed a variety of colours, for gloves.

Oil or Chamois Leather.

There are fourteen exhibitors of chamois leather, of whom four are English manufacturers, two French, and eight of other countries.

The peculiar quality given to leather by the process of the oil or chamois leather manufacturer is extreme softness, which renders it a suitable article for gloves, and many other uses where this quality is required.

It is manufactured by the continued application of cod-oil to the skin, alternately with a process of beating in fulling mills, and exposing to the air for partial drying. In about ten repetitions of the oiling and drying process, the skins are sufficiently saturated, and are allowed to remain in tubs until they become hot by natural fermentation, after which they are washed in a strong alkali, and a most perfect and useful kind of leather is formed.

So recently as the commencement of the present century, sheep skins manufactured in this mode were extensively employed as clothing; but woollen cloth has gradually superseded their use, and the trade has considerably declined in consequence.

The Jury award Prize Medals to the following Exhibitors :—

PULLMAN, R. W. and J., 17 Greek Street, Soho, London (285), for an assortment of buck, doe, and chamois leathers of every description, very perfectly manufactured, for a variety of purposes.

TEXIER, junior, Niort (1033, France), for specimens of buck, doe, and fawn leather, and for some well-dressed chamois sheep leather, stained in a variety of colours for gloves.

The Jury make Honourable Mention of the following Exhibitors :—

LAYDET and Co., glove manufacturers, Paris (296, France), for specimens of chamois leather, dyed in suitable colours for gloves. (Awarded a Prize Medal by the Jury of Class XX.)

RANDALL and DICKS, Greek Street, Westminster (284), for a well-manufactured assortment of buck, doe, and chamois and gaiter leather. These exhibitors show the application of chamois leather in the pianoforte, where it is used to stop the prolonged vibration of the wires.

Dyed Sheep-skin Rugs, &c.

There are thirteen exhibitors of dyed rugs manufactured from English sheep and Angora goat skins. Though the manufacture is of recent origin in this country, it appears to have been known to the eastern nations in the most remote times. In the Old Testament, the "ram skins dyed red" are mentioned, Exod. xxvi. 14, as ornaments for the tent of the Holy Tabernacle. The sheep skins of England, especially the coarse wool skins of Lincoln and Leicestershire, are more adapted

for this purpose than those of any other country, on account of the peculiar lustre of the wool. These rugs are extensively used in Great Britain for door-mats, and are exported to America and the continent of Europe. The excellence of the manufacture consists in the perfect extraction of the natural grease, in making them complete leather with alum and sumach, and in dyeing the wool permanent and bright colours.

The Jury award Prize Medals to the following Exhibitors :—

BEVINGTONS and MORRIS, 67 King William Street, London (352), for an assortment of sheep-skin rugs, in great variety of colours. These exhibitors show bordered rugs of several designs, in good taste; and Angora goat-skins, manufactured in a similar manner.

CLARKE, C. and J., Glastonbury (48), for sheep and lamb-skin rugs, dyed and manufactured into a variety of useful articles.

DEED, J. S., Little Newport Street, Westminster (10), for Angora goat and English sheep-skin rugs dyed in many beautiful colours.

The Jury make Honourable Mention of the following Exhibitors :—

ROOD, G., and Co., Bolton Borough, Glastonbury (49), for heartb rugs made from dyed Angora goat skins, and for varieties of door mats manufactured from English sheep and lamb skins.

WINSOR and SON, Bermondsey, London (14), for a good assortment of dyed sheep-skin rugs, skins for cavalry saddles, and several manufactured articles.

Vellum and Parchment.

Parchment is prepared from sheep-skins by the simplest process. After the skin has been steeped in lime and water, it is stretched in a frame, and by repeated working with hot water, and several applications of whiting which are dried in the sun, the skin is entirely cleansed from the grease. It is brought to a fine surface by skilful labour with a round sharp knife, and when dry is fit for use.

Vellum is made from calf-skins prepared in a similar manner.

This manufacture is represented by seven Exhibitors.

The Jury award Prize Medals to the following Exhibitors :—

BERTHAULT, Issodun (56, France), for a very complete and extensive assortment of parchment and vellum, applicable for deeds, bookbinding, tambourines, and for the machinery of spinning-mills.

LEVER, J. and J., 13 Size Lane, London (24), for specimens of vellum and parchment, manufactured for bookbinding, deeds, and tambourines. These exhibitors show some well-dyed vellum, and other samples adapted for paintings.

The Jury make Honourable Mention of the following Exhibitors :—

EVANS and SON, 10 Silver Street, London (18), for specimens of well-manufactured parchment, and for direction-labels, very completely made from the same material.

SONDERMANN, W., Erfurt (743, Prussia), for vellum and parchment of extreme whiteness, prepared for deeds, drum-heads, and for machine or cylinder parchment.

Saddlery, Harness, and Portmanteaus.

In reporting on saddlery, harness, and portmanteaus, the Jury remark, that the general character of the articles is highly creditable to the exhibitors, and show that considerable skill and ingenuity are devoted to this department of industry. There are upwards of 120 exhibitors in this subdivision.

From the nature of the manufacture, it is less concentrated in particular localities than most others. There is no town of note in England where one or more of the trade does not find ample occupation ; and as the manufactured article continually falls into the hands of distant makers for repair, the knowledge and inventions of one manufacturer are quickly circulated through a wide district. Hence we find considerable uniformity and excellence of manufacture in this department.

The chief endeavour of the saddler and harness-manufacturer is to obtain strength with lightness and convenience of form ; for which purpose the strongest kinds of leather are used in combination with iron, wood, and other materials. Walsall, in Staffordshire, is the principal seat of the wholesale trade, where considerable quantities of saddlery and harness are prepared for exportation. Great ingenuity and invention have been displayed in the numerous varieties of bits, of which there are very many sorts known to the trade.

The necessity of judging of the saddlery of other countries by a very different standard from our own is evident ; the form of saddle, for instance, that is well designed for our smooth roads and well-trained horses, would be very inefficient in the mountainous districts of Spain and South America.

The Jury have had their attention called to some portmanteaus, of very ingenious and clever construction, which, from the facilities they afford the traveller of rapid arrangement and convenience of access, will promote the comfort of a very numerous class of the community.

The Jury award Prize Medals to the following Exhibitors :—

BAKER, B. J., Boston (498, United States), for a light harness of superior materials and workmanship.

BLACKWELL, S. and R., 256 Oxford Street (78), for phaeton harness of patent black leather. The mountings are in good taste ; the materials and workmanship are also of good quality.

BLYTH, R., 4 Park Lane, Westminster (90), for a lady's saddle, well manufactured ; and a hunting or park saddle, with improved elastic seat.

BRACE, H., Walsall, Staffordshire (58), for two cases of bits, stirrups, and spurs, for the South American market.

BROWN and SON, Birmingham (65), for specimens of saddle-trees with whale-bone springs, galvanized plates, &c., to prevent corrosion.

CAISTER, A. B., 7 Baker Street, Westminster (77), for well-manufactured hussar and hunting saddles, with pair of harness pads.

COOPER, M., York (50), for a case of saddlery, containing articles of very superior workmanship : the racing saddle, in particular, weighing only two pounds, is remarkable for its neat manufacture.

CUFF, R., 18 Cockspur Street, London (96), for an embroidered velvet saddle, riding bridle, and harness, manufactured with much taste and elegance.

EARNSHAW, H., 91 Wimpole Street, London (107), for a case of harness, containing blue morocco and other bridles, well manufactured.

HICKEY and TULL, Philadelphia (58, United States), for two portmanteaus, well arranged and strongly constructed.

KANE, G., Dublin (62), for portmanteaus and camp furniture, so ingeniously contrived, that most of the articles required to furnish an officer's apartment are contained in a travelling chest.

LACEY and PHILLIPS, Philadelphia (41, United States), for a case of harness, in which the mountings are of solid silver; the materials are of excellent quality, and the workmanship very elaborate.

LADOUBÉE LE JEUNE C., Brussels (256, Belgium), for saddlery and harness, manufactured in excellent style, with good materials and workmanship.

LANGDON, W., junior, 9 Duke Street, London (89), for a light phaeton harness, constructed of the best materials, and well adapted for its intended use.

LAST, S., 256 Oxford Street, London (38), for a well-contrived railway portmanteau, divided into four compartments, to facilitate the access to any articles contained in it.

MIDDLEMORE, W., 31 Holloway Head, Birmingham (67), for a lady's embroidered saddle, and another with elastic seat; also for a new mouthing rein for unbroken horses, &c., the whole well manufactured.

MORRIS, R., Montreal (113, Canada), for a set of double sleigh harness, of excellent material and workmanship.

PASSMORE, W., 27 Little Windmill Street, Westminster (79), for a set of single-horse harness; the style and workmanship are in every respect superior.

POLOCK, J., Glasgow (279), for a very perfect set of Scotch harness.

PRAX and LAMBIN, Paris (688, France), for a large and varied collection of saddlery and harness; many of the articles are elegantly designed, and the materials have been well selected.

SWAINE and ADENEY, 185 Piccadilly, London (92), for large assortment of whips and canes, showing much taste in the manufacture, and superiority of workmanship.

WHITE, J. C., 29 Liverpool Street, London (86), for silver-mounted harness with improved registered tug. A very useful and ingenious invention.

The Jury desire to make Honourable Mention of the following Exhibitors:—

ADAMS, H., New York (476, United States, page 191), for a portable saddle ingeniously contrived.

ASHFORD, W. and G., Birmingham (64, page 87), for specimens of whips of various designs, well manufactured.

BANTON, E., Walsall (56, page 87), for a case of bridles of good workmanship and superior quality.

BELL, C., 34 Wigmore Street, London (93, page 87), for a lady's saddle and single harness.

BYWATER, W. M., 99 Piccadilly, London (94, page 87), for harness and improved Russian cavalry bridles.

COWAN, L., Barrhead, New Paisley (273, page 90), for a very good set of Scotch cart harness of patent leather.

HUDSON, S., Dublin (60, page 86), for a hunting saddle with elastic seat, and a side-saddle with safety stirrups.

HUGHES, R., Clifden Street, Finsbury, London (106, page 87), for heraldic mountings for harness.

MAXWELL and Co., 161 Piccadilly, London (52, page 86), for socket spurs in several stages of manufacture.

PENNY, J., 37 Union Street, Middlesex Hospital, London (91, page 87), for a state pony bridle, designed by W. H. Rogers, made by W. Langdon.

STEWART, W., Toronto (134, Canada, page 169), for a set of single sleigh harness, made of varnished leather.

The Jury desire to record their great obligations to the under-named gentlemen :—

Mr. Thomas Powell, leather factor, Lime Street.

Mr. William Hackblock, Rood Lane.

Mr. Frederick Dandleker, Hambrectikon, Lake of Zurich.

Mr. Martin Blackmore, Bread Street, London.

Mr. E. W. Roberts, Page's Walk, Bermondsey.

Mr. Alfred Rymer, Nassau Street, Westminster.

Mr. M. Nicholls, Little Windmill Street, Westminster.

Mr. George Kent, Mornington Crescent, Westminster.

Mr. George Kidd, Associate Juror, 257 Oxford Street.

All of whom have very freely given their valuable services in the examination of many of the exhibitors' goods, on the merits of which they were peculiarly qualified to assist the Jury in forming a correct judgment.

J. A. NICHOLAY, }
J. B. BEVINGTON, } *Reporters.*

London, December 1851.

CLASS XVII.

REPORT ON PAPER AND STATIONERY, PRINTING AND BOOKBINDING.

Jury.

SYLVAIN VAN DE WETER, *Chairman*, Belgium; Envoy Extraordinary and Minister Plenipotentiary from H. M. the King of the Belgians.

THOMAS DE LA RUE, *Deputy Chairman*, 84 Westbourne Terrace, Hyde Park; Ornamental Stationery Manufacturer.

CHARLES WHITTINGHAM, *Reporter*, Chiswick, and Took's Court, Chancery Lane; Printer.

A. FIRMIN DIDOT, *Joint Reporter*, France; Member of Central Jury, &c.*

Professor HULSE, *Zollverein*; Director of the Royal Polytechnical Academy at Dresden.

VISCOUNT MAHON, F.R.S., 41 Grosvenor Place.

HENRY STEVENS, *Barnet*, Vermont, United States, residing at Morley's Hotel, London.

CHARLES VENABLES, *Plover Hill House*, High Wycombe; retired Paper Manufacturer.

THE articles which the Jury had to examine were classified in the following manner:—

- A. Paper in the Raw State as it leaves the mill.
- B. Articles of Stationery.
- C. Pasteboards, Cards, &c.
- D. Paper and Scaleboard Boxes (*cartonnerie*).
- E. Printing (*not including Fine Art Printing*).
- F. Bookbinding.

The Jury met on the 17th of May, and continued their labours till the 28th of July, when their awards were finally settled and transmitted to the proper authorities.

They did not think it necessary to divide themselves into sub-committees; but in adjudicating upon the specimens of printing intended for the use of the blind, they requested the assistance of George Sumner, Esq., of the United States, and William Hughes, Esq., of Henshaw's Blind Asylum, Manchester, to which request these gentlemen kindly acceded.

The first duty of the Jury was to refer to the "Decisions regarding Juries," and afterwards to the "Instructions from the Council of Chairmen," in which, among other conditions, it is stated that "a classified list of the subjects under the pro-

* M. Didot, a Greek scholar, and an eminent typographer, engraver, and typefounder, printer to the Institute of France and paper manufacturer, having been appointed member of the Jury, his firm (of which he is the head partner) was excluded from competition. The Jury cannot, however, abstain from expressing their high appreciation of the important services, zeal, impartiality, and talent displayed by M. Didot, both as Joint Reporter and Jurymen.

vince of each Jury is prepared, and forms the *limitation* of each class;" and that "those articles will be rewarded which fulfil in the highest degree the conditions specified in the Sectional List," namely:—

"Increased usefulness, improved form, superior quality, or superior skill in workmanship, new use of known materials, use of new materials, new combination of materials, beauty of design in form or colour, or both with reference to utility, the cheapness with reference to production, and that the Report should describe the state of industry as shown in this Exhibition."

The Jury, in accordance with the foregoing instructions, proceeded to the examination of the different articles. The classified list of subjects was found to be very defective, the classification only extending to English exhibitors, and many articles were found to be misplaced in the classes to which they had been assigned. The Jury had thus to refer several articles to their proper classes, and to decide that maps did not come under their consideration, though several had, in the Official Catalogue, been inserted in Class XVII.; that the lithographic colour press, as well as all other machinery, came under the jurisdiction of Class VI., the Jury offering at the same time to give their assistance and opinions individually or collectively, should any such assistance or opinions be desired; that they could take cognizance neither of literary merit, as had been required of them, nor of different philological systems of printing, as phonetic printing, phonotypy, phonography, &c., &c.; and lastly, that several specimens of calligraphy and penmanship had erroneously been sent to them.

With regard to the foreign department the Catalogue was still more imperfect; and the Jury had to search out the articles which appertained to their Class. It is greatly to be feared that, notwithstanding all the care taken by the Jury, there may be articles which have escaped their observation.

It will be observed that the Jury, in strict conformity with the principles laid down by the Royal Commission, have only recommended one Council Medal, and that for typography; not that they did not recognize the excellence and beauty of many of the specimens exhibited, and the skill and perfection which, in many points, the art of printing displayed, but because there did not appear to be any production so clearly bearing the character of *novelty of invention or new application of a known principle* as to justify such a recommendation, with the exception of the products of the Imperial Court and Government Printing Office of Vienna, which presented both novelty of invention and a number of new combinations in the art of typography.

No prize was awarded to publishers, as such, notwithstanding the merit of their publications.

Until recently bookselling had not been represented at the Exhibitions of Industry: the instructions given to the Jury of the great industrial Exhibition of all Nations did not assign to it any distinct position; and, therefore, in the different countries, the booksellers have refrained from sending their publications, not deeming that their trade, connected more or less closely as it is with the sciences and with letters, could be looked upon as a branch of industry.

Several booksellers of France, Germany, and Belgium, have, however, thought that the creation of a book being the result of a combination of different industrial branches—such as wood-engraving, metal-engraving, colouring, the choice of types,

and of the various kinds of paper, &c.,—the bookseller ought to be looked upon as the partial creator of these industrial products, the first idea of which he had in many instances conceived.

In awarding the Prize Medal, the Jury have, in each branch, observed the general principle of acknowledging the various kinds of excellence to be met with in each article under consideration, without entering into the question of relative merit.

Some articles, though having no claims either to a Prize Medal or an Honourable Mention, contained, nevertheless, some merit, which justified the Jury in noticing them in their Report. They do not profess to express an opinion upon every article exhibited, notwithstanding the care they have taken in making a critical examination of the whole; thus their Report has reference to the general merits of the goods exhibited, as illustrative of the present state of the Paper Manufacture, Printing, and Bookbinding, as pursued in various countries, and the contributions of any individual exhibitor are neither commented upon, nor is any allusion made to them, except in illustration of the Report.

In the appreciation of the articles of this Class, the products of which interest deeply all grades of society—contribute to their moral, intellectual, and social civilization, and give activity and employment to so many minds and hands—it would have been gratifying to the Jury, had they been able to draw a faithful picture of the actual state of all those branches of industry which have occupied the most ingenious inventors, to trace their gradual development, and to indicate their probable future growth. The Jury feel how imperfectly they have succeeded in attaining this end: they have, however, given a rapid historical sketch of the origin and progress of Printing, of Paper Manufacturing, &c., in order to facilitate a comparison between the past and the present, and to enable the reader in some degree to judge of the real extent of those branches of industry, in various countries, as represented at the Great Exhibition.

The Reporters express their thanks to their Chairman, M. VAN DE WEYER, for his assistance and contributions in the drawing up of the Report; also to their colleague, Mr. HENRY STEVENS, for the information he has given on the state of Type-founding and Paper Manufacture in the United States, as well as for his article on "Printing for the Use of the Blind."

The number of exhibitors of all nations in this class is 559, of which 212 belong to Great Britain; 124 to France; 1 to Algiers; 24 to the Zollverein States, including Prussia, Baden, and the United States of Northern Germany; 23 to the Grand Duchy of Baden, and the West Provinces of Prussia and Electoral Hesse; 19 to Bavaria; 10 to Saxony; 7 to Wurtemberg; 8 to Frankfort-upon-the-Maine; 18 to the Grand Duchy of Hesse; 1 to Nassau; 3 to Hamburg; 1 to Hanover; 6 to the Netherlands; 1 to Persia; 1 to Smyrna; 2 to Portugal; 2 to Rome; 5 to Russia; 2 to Sardinia; 1 to Spain; 5 to Switzerland; 2 to Tuscany; 3 to India; 2 to Malta; 5 to Canada; 1 to New South Wales; 1 to Van Diemen's Land; 23 to America; 19 to Austria; 17 to Belgium; 3 to China; 2 to Denmark; 2 to Sweden; and 3 to Egypt.

The Jury, in conclusion, express their hope that the union of all nations, evidenced by the Exhibition of 1851, may hasten the peaceful solution of a question which concerns at once the rights of justice, of literature, of the sciences, and of typography. Property, the unalterable basis of society, can never be less sacred in

works of genius than in material concerns. Printers and booksellers, whose complaints unite with those of artists and literary men, have shown that the unrestrained reprinting of works, without regard to moral considerations, is generally attended, in every quarter, with greater inconvenience than advantage. The recognition of literary property within proper limits will give more intellectual life, and more creative imagination, to countries in which the reprinting of foreign works now stifles the development of native literature and science.

The custom-houses, now obliged to establish a search, frequently hostile, will relinquish the impediments to commerce and literature, and works will no longer be reprinted in haste, replete with errors, or mutilated according to the will of speculators, and in emulation of each other.

Lastly, the certainty of a wider market will be an encouragement to writers of talent, and to publishers, who are frequently prevented from commencing great undertakings by the fear of seeing their work immediately pirated. Universal co-operation is indispensably necessary to insure the success of great literary and scientific enterprises, which could not fail to flourish in a higher degree if the rights in literary property were recognized.

I.—PRINTING.*

After an interval of four centuries, the date of the Great Exhibition of the world's industry is coincident with the anniversary of that of the invention of printing. It seems as if all nations were assembled in the capital of England to celebrate the centennial birthday of the Press—the most powerful instrument of their civilization. It is by the aid of printing that different nations have imparted to each other their thoughts and their feelings, and have received in some degree a combined existence. Without this marvellous bond, they would have been left to the ignorance and prejudices which foster national warfare, and could never have presented this admirable display of universal harmony and of generous emulation.

When we consider the great costliness of manuscripts at a former period, the difficulty of procuring them, and all the benefits of which society was devoid before the discovery of printing, every friend of study and of exalted intellectual speculations should deem himself fortunate in living at a period when so many stores of instruction are placed within the reach of all.

In every age, and in all countries, printing denotes the state of civilization, of which books are the reflex, and the history of the human mind is written in the progress of bibliography. Thus the first printed books of Germany were almost all devoted to theology and scholastic philosophy, while at Paris ancient literature occupied an equal rank with theology; thus also at Rome, where the remem-

* "I participate in the encomiums bestowed by all former eulogists on this transcendent art, which may justly be considered as the nurse and preserver of every species of knowledge; and while I look into history for an examination of the benefit which mankind has already derived from it, I feel equal, or even still more pleasure in anticipating that which it is yet capable of effecting, when, by being perfectly unfettered all over the globe, it will give rise to and promote a system of universal education, and when, as a certain consequence of that education, all societies will direct their strenuous efforts towards bringing into complete operation that divine morality which has for its basis this simple but sublime maxim, 'Do unto another that which you would wish another should do unto you.'"—*On the Art of Printing, by the late Charles, third Earl Stanhope.*

brance of ancient literature maintained a still stronger empire, printing under the guidance of the Bishops of Aleria and Teramo, principally reproduced the masterpieces of classic times. In France, however, under the influence of the chivalrous reign of Francis I., a great number of works upon chivalry soon appeared, and the desire of becoming acquainted with narratives so much in conformity with the prevailing taste, was one cause of the introduction of printing into England. Of the sixty-two works printed in London by Caxton, those upon theology do not amount to ten, the remainder being devoted to chivalry, to history more or less romantic, to literature, and to manners and customs. Without expatiating upon this subject, we will confine ourselves to observing that at the period when the Pope founded at Rome the celebrated printing-office for the "Propagation of the Faith," there was no corresponding activity on the subject in London; and that at the present day, whilst the great printing establishment of the "Propaganda" remains inactive, England every year sends forth to the world a million of Bibles and New Testaments.

Soon after its first origin, the art of printing had attained a great degree of perfection, and it was not till the second half of the last century, that owing to the efforts of Ibarra, in Spain; of Baskerville and of Bulmer, in England; of the Foulises and the Ruddimans in Scotland; of Bodoni, in Italy; and of the Didot family, in Paris, any real progress can be pointed out. The types were better cut and better cast, the ink as good as that of the earliest printers, the paper was improved in its make, and the presswork more uniform.

At that time the greatest admiration and astonishment were created by the rapidity with which at each action of the lever, moved by the hand of the workman, all the pages which a whole sheet of paper was capable of containing, were imprinted at a single stroke; but this rapidity, which enabled a workman to produce in one day more than a thousand transcribers could write, could not long suffice to supply the constantly-increasing demands caused by the march of intellect.

About the beginning of the present century, Charles, the third Earl Stanhope,*

* Mr. Stower remarks, "That the common press is constructed on the true principles of mechanism. It does not, however (he allows), produce an adequate impression from heavy works in small letter without great labour and attention. It was therefore a great acquisition to gain an accession of power with, at the same time, a diminution of labour."

"This valuable acquisition in the art of printing owes its invention to that enlightened and patriotic statesman, Earl Stanhope. The iron press, invented by this nobleman, is capable of ten times the force of the common press, with, perhaps, a tenth of the labour. In working upon this press nothing is left to the judgment of the pressman but the beating."

The Stanhope principle has been applied in all succeeding improvements of the common press, whether of iron or wood.

Mr. Tilloch having given up the prosecution of the art of stereotyping, Mr. Wilson, a printer of respectability in London, engaged with Earl Stanhope for the purpose of bringing it to perfection, and eventually to establish it in this country. His Lordship, it is said, received his instructions from Mr. Tilloch, and had afterwards the personal attendance of Mr. Foulis for many months, at his seat at Chevening, where his Lordship was initiated in the practical part of the operation.

After two years' application, Mr. Wilson announced to the public, that the genius and perseverance of Earl Stanhope, whom he styles "the Right Honourable Inventor," had overcome every difficulty, and that, accordingly, the various processes of the stereotype art had

by the invention of the press which bears his name, and of a new process of stereotyping, more simple and more economical, had made a great improvement in the typographical art. Subsequently Messrs. Bauer and Koenig, aided by the genius and knowledge of English engineers, and by the intelligence and perseverance of Messrs. Bensley and Walter, applied steam power to a new system, which created a revolution in the art of printing. In lieu of the platten, which the workman's arm slowly brought down upon the types, two cylinders printed with rapidity both sides of the sheet, whatever its size might be. In November 1814, by means of this machine, which was subsequently much simplified, the "Times" newspaper was printed with a rapidity which surpassed Guttenberg's press even more than the latter did the hand of the transcribers. It might have seemed that the rapidity of production in printing could proceed no further; but after having been repeatedly altered in its form, the printing machine appears before us now in an entirely novel shape, and we might believe on seeing the "Times" newspaper printed by Applegath's new system, that the highest degree of speed had been attained, did not experience prevent mankind from assigning a limit to the perfectibility of human inventions, and to the inscrutable designs of Providence.

Mr. Koenig's machines, patented in 1814, were far too complicated and expensive, and the inking too imperfect, for general adoption. They were superseded by Mr. Edward Cowper's machine, which he invented and patented in 1816. Almost all the large editions of modern works are printed by Cowper's machines, and the influence they have had on the publication of books of all kinds is far beyond any expectation entertained at the time the machine was invented. After it had been in use some time, it was stated in Court, by an eminent lawyer (now a noble Lord), that, "if it had not been for Mr. Cowper's machine, it would have been impossible to supply the demand for books:" this is not correct, for at that time the hand-press *did* supply the demand; but the striking and important fact is, that the *machine* created a demand, and called into existence books which, but for it, would scarcely have been thought of. As the machine-work from type and wood-cuts was far better than the ordinary printing of the day, booksellers were induced to print extensive editions, because they saw the machine could accomplish all they required. One of the first booksellers who availed himself of this power was Mr. Charles Knight, who projected the "Penny Magazine," on a hint from Mr. M. D. Hill, Queen's Counsel. Each number, published

been so admirably contrived, combining the most beautiful simplicity with the most desirable economy, the *ne plus ultra* of perfection with that of cheapness, as to yield the best encouragement to the public for looking forward to the happy period when an application of this valuable art to the manufacture of books would be the means of reducing the prices of all standard works at least thirty, and, in many cases, fifty per cent.

In January 1804, the stereotype art (with the approbation of Lord Stanhope) was offered by Mr. Wilson to the University of Cambridge, for their adoption and use in the printing of Bibles, Testaments, and Prayer Books, upon certain terms and conditions highly advantageous to Mr. Wilson; for, with his Lordship's characteristic generosity, Earl Stanhope uniformly declined to accept even the reimbursement of any part of the moneys by him expended in the prosecution of this ingenious art. Some differences, however, arising between Mr. Wilson and the officials of the University, the contract was dissolved, and Mr. Wilson published his case in a stereotyped pamphlet, entitled, "Arbitration between the University of Cambridge and Andrew Wilson."

weekly, consisted of eight pages of letterpress, illustrated with good wood-engravings. The public was astonished at the cheapness and good quality of the work, but it was its immense sale which rendered it profitable; for some years it amounted to 180,000 copies weekly. Mr. Knight, whose services in the cause of educational literature entitle him to the highest praise, expended 5,000*l.* a-year in woodcuts for this work. The Cowper machine has been the cause of the many pictorial illustrations which characterize so large a portion of modern publications. The "*Saturday Magazine*," "*Chambers' Journal*," the "*Magasin Pittoresque*," in France, and numerous others, owe their existence to this printing machine. The principle of *cheap editions and large sales* soon extended to established works of a higher value. A remarkable instance of this was the edition of Sir Walter Scott's works, with notes, edited by himself: instead of the old price of 10*s.* they were sold at 5*s.* a volume, and the demand created by this reduction of price was so great that, although the printer had a strong prejudice against machines, he was compelled to have them, the presses of his large establishment proving totally unable to perform the work, which amounted to upwards of 1,000 volumes per day for about two years. The Universities of Cambridge and Oxford have adopted Mr. Cowper's machines for printing vast numbers of Bibles, Prayer-books, &c. &c. A Bible, which formerly cost 3*s.*, may now be had for 1*s.* Mr. Cowper recommended the Religious Tract Society to put aside their coarse woodcuts, to have superior wood-engravings, and to print them with his machine. The Society adopted these suggestions, and the result is, that by sending forth well-printed books, it could now support itself by their sale, without any aid from subscriptions.

As to newspapers, "*THE TIMES*," for instance, prints about *Thirty-five thousand* copies every day, and as this newspaper is of a very large size, often with a supplement, the aggregate amount is more than thirty acres of printed surface per day—a quantity that could not possibly have been effected by hand-presses. At the "*Times*" office there are four machines, invented by Cowper and Applegath, printing from 4,500 to 5,000 impressions per hour; and two machines, lately invented by Mr. Applegath, printing *Ten thousand copies* per hour—a hand-press producing only 300 impressions per hour. The great point obtained in these machines is the perfect distribution of the ink, and the power of causing the type to pass under the inking-rollers twice for newspaper work, or from four to eight times for book-work, thus insuring the type being well inked. The effect was so striking, as to induce Mr. Cowper to apply the inking roller* and table to the common press, and this method has entirely superseded the old printing halls,

* Earl Stanhope, when he invented the Printing Press which will bear his name to posterity, coupled with his object an idea of inking the form on the press by means of a revolving cylinder, and in pursuit of this plan spared no expense in endeavouring to find a substance with which to cover his rollers. He had the skins of every animal which he thought likely to answer the purpose, dressed by every possible process, and tried many other substances, as cloth, silk, &c., without success. The unnecessary seam down the whole length of the roller was the first impediment, and next the impossibility of keeping any skin or substance then known always so soft and pliable as to receive the ink with an even coat, and communicate the same to the form with the regularity required. All the presses of his early construction had at each end of the table a raised flanch, type high, for the purpose of applying his rollers;

and completely abolished the imperfect inking, technically called "*monks and friars*," so frequently seen in books printed by the old system. The effect of Mr. Cowper's ingenious invention is, that books are well, cheaply, and quickly printed, an abundance of illustrations introduced, and the quality of printing improved all over the world; thus rendering literature accessible to millions.

PRINTING—AUSTRIA.

Printing, invented at Strasburg and at Mayence, and patronized by the Emperor Maximilian, who obtained masterpieces * from it at its very commencement, appears in this Exhibition with a degree of splendour which has caused general surprise. No less encouraged in our day by its present sovereign, the Imperial Printing-office of Austria has proved itself equal to its duties, and has accelerated the progress of the art by numerous experiments of all kinds. Xylography, engraving, type-founding, stereotyping, whether by plaster moulds or by means of gutta percha and the galvano-plastic process, electro-metallurgy, by which fossil fishes and animals buried in the antediluvian era are reproduced upon paper; galvanography, galvanotype, chymitype, all those new applications of art and science which dimly foreshadow an unknown future, are represented here; and lithography, that new sister of typography, also appears, with the new adjuncts of chromotypy and chromo-lithography.

The beautiful and rich collection of Oriental types, of which we have counted more than a hundred different sorts, as well engraved as they are well cast, proves that in Austria learning is not less encouraged than the arts.

By the side of so many objects relating to typography, we must admire the typographic plates, each measuring 540 square inches, formed by the galvanic process, and producing, in copper, letters of all languages, from which many millions of copies may be printed without any appearance of wear and tear.

M. HAAS, of Prague, has distinguished himself by various efforts towards sustaining the long-established reputation of his house.

After the admirable display made by Austria, of numerous specimens of well-executed typography in all languages, the Jury hardly feel themselves authorized to express a wish that, among the great and increasing number of printers in that empire, a few had sent their productions, to show how far the art has advanced without the support of the government. The only exhibitor in letterpress, besides M. Haas, was M. BATTAGLIA, of Venice, who sent fair specimens of typography, in simple and convenient binding. As publishers, MM. MULLER and NEUMAN, of Vienna, exhibited books and albums got up with much care.

PRINTING—PRUSSIA.

Next to the Imperial Printing-office of Austria we notice that of M. DECKER, the printer to the Royal Academy of Berlin. The large folio New Testament, the

but the obstacles interposed by nature herself totally baffled and defeated his Lordship's plans in this respect.

* This may be judged of at the British Museum, by the unique copy upon vellum, printed by Schensperger about 1514. It is a magnificent "*livre d'heures*," the execution of which is even superior to that of the celebrated book of the Adventures of Teuridanek.

German translation by Luther, is a masterpiece of typographic art. The printing of it is perfect, the types are well cut and cast, the ink is black and brilliant, and the paper excellent. Great praise must also be accorded to the edition of the complete works of Frederick the Great, a literary and typographic monument of great beauty, raised by Prussia to its hero. The five volumes in large quarto, already published, are worthy in every respect, by their typographic execution, of the importance of such a work.

M. Decker exhibited, amongst the specimens of types from his foundry, some beautiful Oriental types, engraved in part with the co-operation of the Academy of Berlin, and also specimens of brass rules, of great depth in the engraving, and of very superior execution.

M. LIEPMANN'S ingenious invention for printing in oil from a mass of solid colours, as a substitute for semifluid printing inks, has attracted the notice of the Jury, and they hope that when it has been sufficiently improved, this may be a valuable adjunct to ornamental printing.

M. G. WESTERMANN, of Brunswick, has shown a specimen of good printing in the work entitled "European Gallery," printed upon German paper.

From Elberfeld, M. BAEDEKER'S "German Bible" in folio is a specimen of small and neat type printing. M. HAENEL, of Berlin, exhibited bank-notes and labels, in gold and colours, possessing some merit,

PRINTING—SAXONY.

M. HIRSCHFELD'S, at Leipzig, and some other typographic establishments, maintain printing in an honourable position in Germany.

The considerable number of publications printed in a single year by M. BROCKHAUS, who is at the same time a printer, a type-founder, a bookseller, and publisher, at Leipzig, has attracted the notice of the Jury. All these publications are directed towards literary and scientific purposes, and each edition is very large. Although his printing aims less at the perfection of the art than at cheapness and correctness, we have nevertheless remarked a charming little volume, entitled *Die Bezauberte Rose*, by Schultze.

The books printed and published by MM. VIEWEG, of Brunswick, who are also type-founders and paper-makers, are not less worthy of remark for their aim at scientific usefulness. The execution of them is without any attempt at fine printing, but is such as suits this description of books.

M. BARTH'S work "Minstrels of Germany" printed at Leipzig, on parchment, and the publications of M. SCHMERBER, of Frankfort, should also be mentioned.

In general, the Jury have observed, in all the books exhibited in the German Department, great improvements in the paper, in the clearness and neatness of the type, and the quality of the ink.

PRINTING—ITALY.

Printing, soon after its discovery, was carried to Rome by some German printers. The Popes Sixtus V., Leo X., and Clement XIV., founded the celebrated printing-office of the Vatican, for the purpose of printing the works of the Holy Fathers and the Holy Scriptures, and of propagating the Catholic Faith. Their beautiful Oriental types give this printing-office an honourable standing, but its publications are few, and do not keep pace with the progress of the times.

The Vendelins of Spires, and the Jenson, were early established in Venice. They introduced some happy modifications into the types by making them approach nearer to the beautiful letters of Roman inscriptions. The Aldi still further improved them, and invented the sloping types called *italic*. Their beautiful and erudite publications are remarkable even in the present day for their typographic execution.

At the end of the last century, and at the commencement of the present, Bodoni, a typographer of consummate skill, who was at the same time the engraver and founder of the types which he so carefully printed, published his beautiful editions—true masterpieces—which have earned for him the highest renown, but in which he perhaps sacrificed too much to typographic luxury.

Italy has sent but few typographic productions to this Exhibition; nevertheless the Jury have remarked with interest the large folio volume of "The History of the Abbey of Altacombe," skilfully printed at Turin, by MM. CHIRIO and MINA. The type is very beautiful, and each page is surrounded by a border imitated from one of the exquisite manuscripts of the 15th century. The wood-engravings have been multiplied by the galvanoplastic process.

PRINTING—SWITZERLAND.

Notwithstanding its flourishing trade in books, and the great number of printers established in the Cantons, Switzerland has not given the Jury an opportunity for judging of its progress in typography.

PRINTING—ENGLAND.

The first book printed by Caxton, after a long residence in the Low Countries, appeared in London in 1474; and it is worthy of note, that the first book in the English language was printed by him, not in England, but on the Continent, in 1471. Almost all those which he printed, and which he translated himself, to please the Princess Margaret, sister of King Edward the Fourth, and at the solicitation of the great lords and ladies of that time, were devoted to chivalry. His types, and those of his successors, Wynkyn de Worde and Pynson, are a not very elegant imitation of the writing then used in England. Up to the time of Buckley, in 1733, the art of printing made little progress in this country. It was Baskerville who, in 1750, turning his thoughts from jappanning to typefounding and printing, first gave to the art a real impulse. He spent several years and much of his fortune before he was able to produce types to his own satisfaction. In 1757 he issued his first book—a Virgil, in quarto. Between this date and 1763 he printed those charming editions of Milton, Addison, The Common Prayer, The Bible, Juvenal and Persius, Horace, &c., which are still celebrated for their typographical beauty, and cause the name of Baskerville to be ranked among the most eminent men who have contributed to the improvement of the Art of Printing. The paper which he caused to be made was superior, and all his apparatus for printing, including his ink, presses, chases, punches, matrices, moulds, and types, were produced by himself, and were all great improvements. His process of drying and glazing his paper and ink, as soon as printed, by means of hot plates of copper, was expensive, and had some other faults; but the taste of the period was not then ripe for luxury in printing, and notwithstanding that he offered to print for the London booksellers within five

per cent. as low as the printers they employed, he complained that he was unable to get work from them. Accordingly, in 1767, we find him writing to his old friend Franklin :—"After having obtained the reputation of excelling in the most useful art known to mankind, of which I have your testimony, is it not to the last degree provoking that I cannot get even bread by it ?" Then, as now, many persons would encourage bad printing, because it was cheaper. His types, though rather lean for large books, were held in much estimation, and in 1779, four years after his death, were sold to a literary society in Paris for 3,700*l.*, and were, in 1784, first employed in printing Beaumarchais' celebrated edition of Voltaire, in seventy volumes, a work at that day unsurpassed in typographic luxury. Thus ended the first real attempt at improvement in England.

At the end of the last century Mr. William Bulmer and Mr. Thomas Bensley made a fresh progress in the art of printing. Their beautiful publications rivalled the most remarkable productions of France, Spain, and Italy ; and the magnificent edition of the works of Shakspeare, in nine folio volumes, embellished with engravings after the most able artists of England, and printed by Bulmer with great skill, excited the zeal of M. M. Didot, who wished to raise in France a like monument to Racine, and printed a folio edition, unequalled for its typographical perfection.

At the commencement of the present century, the late Mr. Charles Whittingham brought out the elegant editions which have rendered the Chiswick Press so celebrated. Until that time no one had printed wood-engravings so perfectly, by the application of *overlays** necessary for obtaining gradations in the tints. This success encouraged the engravers to give to woodcuts a fineness unknown in the times of Albert Durer, Wolgemuth, and other engravers, who were obliged to employ broad lines, the unevenness of the paper and the imperfections of the presses rendering the printing of fine lines impossible.†

At the present day, when speed is imperatively demanded by the public, the means of satisfying this demand are everywhere numerous and powerful. This fact may be judged of in London by the printing-office of Messrs. Clowes (printers of the Official Catalogue and of the Reports by the Juries), in which two steam-engines put in motion twenty-six printing machines ; by that of Spottiswoode, the printer to the Queen, &c. ; and by the printing-offices of "The Times," and other large London newspapers, which publish in the morning the long debates in Parliament, so often continued until late in the night. This rapidity of execution would have appeared fabulous in the last century ; and it ought to be remarked that the speed does not, in England, in any way prevent the correctness of the work, which is in general remarkable, even in the immense daily newspapers. This advantage must be attributed, in a great measure, to the main-

* It is also possible that the system of lowering wood-cuts was one of the means adopted by the engravers who were employed for the Chiswick Press in order to facilitate good work. In 1844 the Trustees of the British Museum permitted casts to be taken of the original wood blocks engraved by Albert Durer, in 1510, of his *Passio Christi*, and an edition was printed in English, edited by Henry Cole, Esq. These cuts are very much lowered.

† The term *engraving* is misapplied as to the works of Albert Durer and his contemporaries, for it was not the *graver*, but the *knife*, that was used to produce the blocks from which impressions were then taken ; after the manner of block cutting for calico printers of the present day.

tenance of the ancient custom of the printers in England. Here it is required that there should be seven entire years' apprenticeship of every working printer, whether he is destined to be a compositor or a pressman. This beneficial custom, by means of which the workman becomes more skilful and more attached to his profession, is gradually re-establishing itself in all the countries in which, by reason of political commotions, it had fallen into disuse, to the great detriment of the art.

While in most other countries of Europe the patronage of the Government appears indispensable to the creation or the development of a great number of branches of industry more or less intimately connected with the fine arts and science, England affords a striking instance of how they are capable of being nurtured and developed without this support. The strength of its institutions, its spirit of association, the immensity of its capital, and its indomitable perseverance, enable the typographic art to develop itself solely by its own resources. The Tract and Bible Societies, which have printed the Holy Scriptures in all languages, are a remarkable proof of the power of association animated by a religious spirit.*

The numerous and voluminous encyclopedias, of which the *Encyclopedia Britannica* alone, in 26 large quarto volumes, has reached its seventh edition, and the large number of important popular publications, also prove the immense resources of this country.

Although neither of the great Universities of Oxford and Cambridge has taken any part in this Exhibition, the Jury must commemorate the high merit of the Clarendon Press in the one, and of the Pitt Press in the other. During a long series of years, Oxford has been remarkable for the well-sustained beauty of its Greek and Latin publications, as well as of those in the English tongue.

Mr. PARKER, the bookseller of the University of Oxford, has exhibited, as a publisher, several works on mediæval architecture, remarkable for their correctness, the beautiful execution of the wood-engravings, and the goodness of the paper.

The Jury have strongly regretted, and this regret has been recorded on their minutes, that almost the whole of the printers of England have refrained from exhibiting the beautiful productions of their presses, owing to the instructions given to the Local Commissioners, which stated that printed books were inadmissible. However, some fine specimens of good printing seem to have crept in by mere chance, such as Messrs. BRADBURY and EVANS'S beautiful work of Mr. Marryat, "Collections towards a History of Pottery and Porcelain," neatly executed; Mr. PICKERING'S "Victoria Book of Common Prayer," in large Old English type, the Rubrics in red. This book has been carefully collated with the Sealed Book in the Tower of London. It is on super-royal paper, made by Mr. T. H. SAUNDERS, of Daraneth, Kent: it is hand-made, hard tub-sized, from fine strong rags, without any artificial colour; the moulds were made expressly, the wires finer and closer placed, to imitate the old moulds. This is a supplemental volume to Pickering's Series of the Common Prayer, which shows all the changes made in the Ritual from the Reformation to the Savoy Conference. The

* The statement published in May 1851, by one single institution, the British and Foreign Bible Society, founded in 1804, shows the production of 24,247,067 copies of the Old and New Testament, in one hundred and forty different languages, which have been distributed over the whole surface of the globe by the exertions of the Protestant missionaries. The expenditure, exclusive of the annual engagements, has amounted to £ 3,751,555.

Booke of Common Prayer, noted by John Merbecke. This is a verbatim reprint, showing what parts of the service were chanted in the reign of Edward VI.; the notes are black on red ledger-lines; the paper the same quality and make as the Victoria Prayer Book, but in water-leaf, that is, without size. Also the first six books of Euclid, with diagrams and symbols printed in colours, which are used instead of letters, for the greater ease of learners: all these are from the press of Mr. WHITTINGHAM. Mr. BAGSTER's well-printed and useful "Polyglot Bibles;" Mr. MACKENZIE's (of Glasgow) good specimens of Church Text, illuminated with red capitals; Messrs. REED and PARDON's neatly executed specimen of their founts; Mr. SMITH's specimens of Hercules Ellis's Poetry; Major BELL's well-got-up Tables of Universal History, &c. &c. Two other works must be mentioned, as being connected with the Great Exhibition—Mr. BRETTELL's Hymn for all Nations, by Mr. Tupper, translated into thirty languages, and Mr. OWEN's reprint of the speech of H. R. H. Prince Albert, at the Mansion House Banquet, also translated into several European and Oriental languages.

The same principle which prevented the English printers from exhibiting their works has deprived the publishers of the opportunity of taking, at the Great Exhibition of all Nations, that high position to which their beautiful and carefully edited works would have justly entitled them. The names of Longman, Murray, Moxon, Bohn, Pickering, and of a great many others, are for ever inseparable from the history of English literature; and thousands would again have seen with satisfaction, and shown with pride to foreigners, the numerous cheap, neatly printed, and beautifully illustrated productions of Mr. Charles Knight, who in ministering to the intellectual wants and pleasures of the people, has given in the right direction an impetus which is still felt in all branches of art and manufacture connected with this class.

The following statistical Tables by Mr. Edward Edwards, Secretary of the London Society of Compositors, cannot but prove interesting:—

TABLE showing the Rate of Wages per week, and Number of Journeymen and Apprentices in 79 towns in the United Kingdom.

ENGLAND AND WALES.				ENGLAND AND WALES—continued.			
Name of Town.	Rate of Wages.	Number of Journeymen.	Number of Apprentices.	Name of Town.	Rate of Wages.	Number of Journeymen.	Number of Apprentices.
	Shillings.				Shillings.		
Aylesbury - - -	24	9	9	Cambridge - - -	27 to 40	67	50
Banbury - - -	24	9	5	Durham - - -	21	23	35
Bath - - -	25	64	49	Darlington - - -	18 to 24	11	24
Bedford - - -	21 to 24	12	20	Doncaster - - -	22 to 24	20	11
Berwick-on-Tweed - - -	18 to 20	10	15	Dover - - -	21	7	14
Bradford - - -	24 to 26	18	26	Exeter - - -	18 to 19	30	14
Brecon - - -	23	5	4	Hereford - - -	21 to 24	17	50
Brighton - - -	29	30	50	Halifax - - -	24	24	12
Bristol - - -	24 to 25	20	100	Hertford - - -	28	10	18
Bolton - - -	27	12	22	Huddersfield - - -	24	10	7
Blackburn - - -	24	7	12	Isle of Man - - -	12 to 20	10	16
Canterbury - - -	20 to 24	10	18	Kendal - - -	24	12	58
Chichester - - -	21 to 30	3	2	London - - -	33 to 48	3000	1500
Cardiff - - -	21 to 24	116	11	Liverpool and Birk- enhead - - -	30	289	500
Chester - - -	27	31	17	Leeds - - -	26	118	100
Cheltenham - - -	24	24	33				

Table showing the Rate of Wages per Week and Number of Journeymen, &c.—*continued*.

ENGLAND AND WALES— <i>continued</i> .				RECAPITULATION.			
Name of Town.	Rate of Wages.	Number of Journeymen.	Number of Apprentices.	Name of Town.	Rate of Wages.	Number of Journeymen.	Number of Apprentices.
Lancaster - - -	Shillings.	10	10	London - - -	3s. to 4s.	5,000	1,500
Leigh - - -	24	2	2	England and Wales	12 to 30	1,937	1,929
Leicester - - -	24	30	30	Scotland - - -	20 to 25	954	550
Lewes - - -	29	18	20	Ireland - - -	12s. to 32s. 6d.	548	475
Maidstone - - -	24 to 25	13	17	Total - - -		8,439	4,454
Manchester - - -	30	500	80				
Macclesfield - - -	18 to 24	11	7				
Nottingham - - -	27	55	60				
Newport (Monmouthshire) - - -	21 to 24	12	10				
Northampton - - -	24	11	22				
Oxford - - -	30 to 33	58	46				
Preston - - -	27	36	28				
Portsmouth and Portsmouth - - -	21 to 28	20	20				
Rochdale - - -	24	6	8				
Scarborough - - -	21	11	6				
Sheffield - - -	28	62	32				
Southampton - - -	20 to 25	21	22				
South Shields - - -	21 to 24	15	8				
Stafford - - -	24	11	7				
Shrewsbury - - -	24	22	23				
Stamford - - -	27	22	13				
Ulverston - - -	21	6	14				
Warwick and Leamington - - -	21 to 25	29	12				
Walsfield - - -	24	14	24				
Worcester - - -	24	31	19				
Warrington - - -	24	4	7				
Woking - - -	27	8	6				
Wolverhampton - - -	24	25	22				
Wigan - - -	27	11	7				
Yeovil - - -	21	4	15				
York - - -	24 to 26	40	30				
		4937	3429				
SCOTLAND.				RECAPITULATION.			
Name of Town.	Rate of Wages.	Number of Journeymen.	Number of Apprentices.	Name of Town.	Rate of Wages.	Number of Journeymen.	Number of Apprentices.
Dundee - - -	20 to 21	40	35				
Edinburgh - - -	25	598	329				
Glasgow - - -	25	280	150				
Kilmarnock - - -	20	6	6				
Perth - - -	20	21	18				
Stirling - - -	20	9	12				
		954	550				
IRELAND.				RECAPITULATION.			
Name of Town.	Rate of Wages.	Number of Journeymen.	Number of Apprentices.	Name of Town.	Rate of Wages.	Number of Journeymen.	Number of Apprentices.
Belfast - - -	25	63	100				
Cork - - -	20 to 26	58	52				
Dublin - - -	30 to 32s. 6d.	180	270				
Galway - - -	15	9	5				
Kilkenny - - -	20 to 21	10	8				
Londonderry - - -	18 to 21	12	24				
Omagh & Armagh - - -	15	12	22				
Sligo - - -	12 to 15	4	14				
		548	475				

In London there are, besides the numbers stated, 800 men and 360 boys who work exclusively at press.

There are printed in London, 50 weekly, 294 monthly, and 35 quarterly publications. The majority of the weeklies, and about 100 of the monthlies, are chiefly composed by boys; but the quarterlies are mostly done by journeymen. In the United Kingdom there are 14 daily papers, 18 tri-weekly ones, 41 bi-weekly ones, and 403 weekly journals. Total, 476. Of these 84 are printed in London, 238 in the provinces of England and Wales, 70 in Scotland, and 84 in Ireland. The ratio of employment afforded for the 14,500 persons in the trade may be stated to be as follows:—

	Newspaper department.		Jobbing, Book-work, Publications, &c.	
	Journeymen.	Boys.	Journeymen.	Boys.
London (daily press excepted)	600	300	1,910	1,200
England & Wales	1,430	1,200	1,070	800
Scotland - - -	500	350	1,000	850
Ireland - - -	600	450	900	850
	3,130	2,300	4,910	3,700

On the London daily press 460 men are employed; boy-labour is not countenanced on this work.

	Shillings per Week
1. London, average wages of 2350 men - - -	25
2. The South Eastern District (8 towns) average wages of 165 members, from	18 to 24

	Shillings per Week.		£.	s.
3. The South Western District (14 towns), 320 members - - -	18	London, 3,000 members at 25s. per week - - -	3,750	0
4. The Midland District (26 towns), 939 members - - - from -	18 to 22	Provinces of England, 2,500 members, at 20s. per week - - -	2,500	0
5. The Western District, Ireland (13 towns), 694 members - - - from -	13 to 22	Provinces of Ireland, 1,500 members, at 17s. 6d. per week - - -	1,312	10
6. The Northern District, Scotland (10 towns), 953 members - - - from -	12 to 19	Provinces of Scotland, 1,500 members, at 15s. 6d. per week - - -	1,162	10
		Total Amount - - -	8,725	0

The following list, extracted from "The Times," of March, 1, 1852, shows the Statistics of the London Daily Newspapers:—

	1845.	1846.	1847.	1848.	1849.	1850.
The Times - - - -	8,160,000	8,950,000	9,025,230	11,021,500	11,300,000	11,900,000
Morning Advertiser - - -	1,440,000	1,480,000	1,500,000	1,538,957	1,528,220	1,549,143
Daily News - - - -	-	3,520,500	3,477,008	3,053,638	1,357,000	1,152,000
Morning Herald - - - -	2,018,025	1,752,500	1,510,000	1,335,000	1,147,000	1,139,000
Morning Chronicle - - -	1,554,000	1,356,000	1,233,000	1,151,304	937,500	912,547
Morning Post - - - -	1,002,500	1,045,500	890,100	863,500	905,000	829,000
Sun - - - - -	-	1,104,000	900,000	803,312	873,000	834,500
Express - - - - -	-	160,000	778,714	888,018	964,000	776,950
Globe - - - - -	852,000	764,000	800,000	720,000	630,000	585,000
Standard - - - - -	846,000	780,000	659,500	652,500	539,000	492,000

In London, the centre of the book trade, nearly 3,000 works (including new editions) are published yearly, of the value of £50,000*l.*; two hundred and thirty monthly and quarterly magazines produce 500,000*l.* yearly. The stamp-duty on newspapers in 1845 was 327,682*l.*; in 1850, sixty-five millions and three quarters of penny stamps, and eleven millions and three-quarters of halfpenny stamps, were used by 159 London and 222 English provincial newspapers. Seven millions and three quarters of penny stamps, and half a million of halfpenny stamps, by 110 Scottish papers. Six millions and three-quarters of penny, and half a million of halfpenny stamps, by 102 Irish papers.—Vide "*Sharp's Gazetteer*," edition 1852, page 977.

Chromotypy, or Printing in Colours.

Hugo di Carpi is said to be the original projector of printing chiaro-oscuro, by surface block printing. In 1754, "Jackson's Essays on the Invention of Engraving and Printing in Chiaro-oscuro," as practised by Albert Durer, Carpi, &c., was published. The editor in his preface states, that "besides the superiority of taste," there is "yet a very essential advantage belonging to this mode, which is, that being done in oil, the colour will never fly off. By this means the same beauty continues as long as the paper can hold together." Unfortunately for this speculative opinion, after the lapse of one hundred years the colour of the ink did "fly off," for the specimens of the woodcuts in oil scarcely retain any of the colours which were supposed to be imperishable as long as the paper lasted. The paper, on the contrary, continues good and strong to this day.

M. J. M. Papillon, in his *Traité Historique et Pratique de la Gravure sur Bois*, 1766, gives directions for making the varnish, and for the choice and mixing of colours for printing in chiaro-oscuro; and shows specimens of the different states of the impressions in the progress of the printing. Mr. Savage, in "*Hints for Decorative Printing*," also gives *practical* directions for ornamental colour printing. His recipes for making coloured inks are, however, incorrect; and although

merit is due to him for again calling the attention of printers to the subject, it is perhaps owing to the imperfection of his inks, as he describes them, that this beautiful branch of printing remained so long neglected after his book was published.

The greatest impulse given to colour surface printing in this country was during the existence of the state lotteries, about 35 years ago. The late Robert Branston, wood-engraver, and the late James Vizetelly, then employed at Messrs. Gye and Balne's printing establishment, greatly promoted the demand for coloured and ornamental printing, the one by his skill as an artist, and the other by his constant endeavours to produce striking effects by means of colour printing; a great emulation for ornamental work being created by the lottery contractors, who vied with each other to render their lottery schemes more and more attractive. Mr. James Whiting, sen., who was one of the principal printers for the Government contractors, also produced great novelties, and subsequently in conjunction with the late Sir William Congreve and Mr. Branston, established the extensive printing-office of Beaufort House for all descriptions of ornamental printing, and particularly for protection against forgery. The case No. 123, Class XXX., exhibited by his son, Mr. CHARLES WHITING, contained some beautiful specimens of relief engravings rendered more difficult to imitate by the aid of the rose engine; cameo embossing* in which the surface of the die is inked; and compound plate printing,† at one impression, in two or several colours, by plates constructed to combine with wonderful accuracy at the moment of taking the impression, by cylinder steam machinery: these plates are similar to those so long in use at the Excise and Stamp Offices, and which are of such great durability, that the medicine label plates now in use have produced millions of impressions during the last 25 years, and are still in daily use at the Stamp Office. It was by the aid of this machinery that Mr. Norman of Frankfort and Mr. Henel of Magdeburgh were both enabled to introduce these principles of printing into their respective countries, the dies and plates being furnished by Mr. Whiting; those gentlemen were not only greatly remunerated for their exertions, but also encouraged by their Governments for the introduction of what was then a new art to those countries. It would be difficult to find any other concern so well adapted in every way as Beaufort House for what it was intended to be at its establishment by Mr. Whiting, sen., Sir William Congreve, and Mr. Branston; and the case exhibited sufficiently demonstrates that Mr. Charles Whiting, who continues the business, fully maintains its well-earned reputation.

When the English state lotteries were abolished, ornamental printing fell greatly into disuse, and it was not until 1832, when Mr. De La Rue took out a patent for printing playing cards, that there was any revival, great facilities being given by the improved coloured inks which he introduced, and which are described in his

* Cameo embossing was reintroduced by the late Mr. Branston.

† *Double Colour Printing Machine*.—When Sir William Congreve was engaged in contriving a method of printing stamps in two colours, for the prevention of forgery, for the stamping department of Government, he applied to Mr. Donkin for his assistance; and Mr. Wilks, who afterwards became that gentleman's partner, invented an apparatus, and made a design for a machine, for the above purpose, which being immediately approved by Sir William Congreve, a model was made, half size, at Messrs. Donkin's works, under the direction of Mr. Wilks, and in 1820 was set to work at Sir William Congreve's residence in Cecil Street and afterwards taken to the Museum at Woolwich.

specification. Since this period rapid and successive improvements have taken place here and on the Continent, and coloured surface printing has arrived at a degree of excellence greatly surpassing that of any former period.

Nothing can be more beautiful and more perfect in execution than the charming plates printed in colours by Mr. BAXTER'S process; but the articles having been placed in the class more especially relating to the fine arts, it is in that class that an account of their merit must be sought for.

M. SILBERMANN, of Strasburg, has exhibited productions, some of which are remarkable for the beauty of their execution, such as the painted windows of the Strasburg Cathedral, and some imitations of manuscripts, enriched with coloured vignettes by surface printing. Others again are to be noticed for their cheapness, such as those little coloured soldiers, of which a hundred and twenty thousand sheets are annually issued, and find a sale in France, Germany, and England.

A geological map, coloured with nine distinct tints, a table representing the effects of the contrast of colours, the employment of which has found a felicitous application in the work of M. Chevreul, Member of the Institute, and other prints executed by this process, prove that science, as well as the arts and commerce, will profit by this branch of industry.

In addition to the Printers already mentioned, who, in Class XVII., exhibited printing in colours, the following had specimens, in which no special merit was observed beyond that of fair and careful workmanship:—*England*—Mr. J. W. FOLKARD; Mr. J. S. HODSON; Mr. SILVERLOCK, London; Mr. EVANS, of Oldham; Mr. RAMSAY, of Edinburgh; Mr. GILL, of Dublin. *Paris*—M. GUESNU; M. MEYER; M. G. BATTENBERG; and M. CHERDON and SONS. *Netherlands*—M. P. H. NOORDENDORP, of the Hague. *Leipzig*—M. HIRSCHFELD. *Dresden*—M. MEINHOLD and SONS. *Frankfort*—M. WOHLFAETH. *Berlin*—M. MOESNER and KÜHN and M. HAENEL. *Canada*—Messrs. BUREAU and MORCOTTE, of Quebec; and Messrs. STARKE and Co., of Montreal.

Printing in Gold.

Dibdin, in his *Decameron* (vol. ii., p. 416), states, that "This country has also an honour and a treasure to boast of in Mr. Whittaker's 'Magna Charta,' printed in letters of gold, with illuminations. His manner of operating is yet a secret. The Society for the Encouragement of Arts offered Mr. Whittaker a premium for his ingenuity, upon the condition, as is usual, of his making the process known; but Mr. Whittaker, aware of the importance of keeping it secret, declined the premium. There are some copies on vellum, beautiful, splendid, and characteristic, beyond any similar work (I had almost said ancient as well as modern) which it has ever been my good fortune to behold. Indeed, taking it 'all in all,' those who have not seen such a union of typographical and graphical skill as those illuminated copies display, can have no idea of the extraordinary felicity of its execution." The method adopted by Mr. Whittaker is the following, for which the Jury is indebted to the kindness of Mr. John Harris (Class XXX., No. 244), who was employed on the work. The page is composed in moveable type in the usual way; a stereotype-plate is taken. A piece of iron of the size of the page, about half-an-inch in thickness, is made hot, and placed on the table of an ordinary typographical printing-press: the stereotype-plate is then placed on the

iron-plate, and gets hot, and leaf-gold of an extra thickness, of the size of the plate, is laid very carefully on the surface of the plate; then the paper or vellum is placed on the tympan in the usual way, having been previously sifted over with dried glare of egg and rosin finely pulverized, which adheres to it in sufficient quantity; the tympan is then turned down, and the pull dwelt on. The degree of heat must be ascertained by practice; if the plate be too hot, the gold is dead and drossy; if too cold, then it appears bright but imperfect. This process is similar to that now used by bookbinders in block gilding with an arming-press.

About 20 years ago, M. Sturz introduced into England printing in gold from copper plates. His process was to mix with printers' weak burnt oil a certain quantity of gold or silver bronze, to the same consistency as that of strong copper-plate ink, and filling the plate with it, to dab it in with the fingers. The plate had to be engraved deeper than usual, and when filled it was delicately cleaned off, first with a rag dipped in a very weak solution of pearlash, and then with the palm of the hand in the usual way. It was afterwards submitted to a heavy impression of the copper-plate press, being printed in the manner called "through press," and the impression, when dry, polished by passing it through the press several times with the printed face against a highly polished steel plate, by which a beautiful brightness was imparted to the bronze. This process, decidedly the best where great perfection is required, has been abandoned by most of the copper-plate printers for the cheap and less tedious one of first printing with a coloured ink ground with gold-size and oil, and then rubbing the bronze on the paper when just printed.

Printing in gold by letter-press soon followed the method of copper-plate gold printing. Messrs. Vizetelly and Branston were the first to apply it; and their visiting and address cards, printed by letter-press, from rose-engine plates, have never been surpassed for the brightness and beauty of their execution.

At about the same period, Mr. De La Rue, in conjunction with the late Mr. Balne, of Gracechurch Street, produced a large royal 8vo edition of the New Testament, printed in gold, 25 copies of which were in pure gold powder. Nothing has since been produced equal to this unique edition. At the coronation of Queen Victoria, Mr. De La Rue undertook to produce the Sun newspaper printed in gold. The rapidity with which this had to be effected was one of many difficulties he had to encounter. Messrs. Clowes and Sons afforded him every aid by placing at his disposal the printing machines of their extensive establishment. Upwards of one hundred persons were employed to rub the bronze on the printed sheets, which had to be brought from the printing office in Stamford Street, as soon as printed, to Messrs. De La Rue's works in Bunhill Row, to be there bronzed and finished. More than 100,000 copies were thus produced; 10,000 in time for the publication of the Sun on coronation day.

Gold printing is now applied to numerous purposes in most countries. The following is the best method of producing good and bright results by letter-press printing. Take the best printer's varnish, grind it to a thick consistency with the best burnt sienna or brown umber, and reduce this with De La Rue's gold size, until it be the thickness of thin treacle; ink the form in the usual manner, and when printed apply the bronze by rubbing it gently over the article with cotton wool. If leaf-gold or leaf-metal is required, it must be laid on carefully, and when dry the sheets should be wiped, to clear them of the superfluous bronze or metal.

The gold printing is much improved by its being passed over polished steel plates, between powerful rollers.

The following exhibitors of printing in gold and silver bronze, and in metal, displayed a variety of specimens, all possessing merit :—

England.—Mr. J. MANSELL, Mr. KRONHEIM, Messrs. DEAN and SON, and also Messrs. ARLISS and Co., who had specimens of printing on tinfoil. *France*.—M. ANGRAND, M. GUESNU, M. MAYER, rue de la Vieille Monnaie, M. MAYER, rue de l'Abbaye, and M. LEFEBVRE, of Paris. *Zollverein*.—MM. SCHAEFER, OTTO, and SCHEIBE, M. E. MANIAC, M. HAENEL, of Berlin ; M. F. FRECHNER, of Guben. *Bavaria*.—M. A. DESSAUER, of Aschaffenburg. *Grand Duchy of Hesse*.—M. FREUND, of Offenbach. *Warsaw*.—MM. FETTER and RAHN. *Austria*.—MM. HAAS and SOX, of Prague, who had a missal printed in gold, as well as a miscellaneous collection of articles.

PRINTING—FRANCE.

As early as 1470 printing was introduced into Paris by the influence of La Sorbonne ; its progress was rapid. Rembold, the partner of Gering, Antoine Vêrard, Simon de Colines, Pigouchet, and others, carried the art of printing to a high degree of perfection. The typographical merit of the publications of Robert and of Henry Stephens would itself be very remarkable in all respects were it not surpassed by the high literary merit of those learned printers.

The Camuzats, the Delatours, the Cousteliers, and the Barbous maintained the good traditions of the ancient printers ; and towards the end of the last century Ambroise Didot was intrusted by Louis XVI. with the printing of the collection of the French classics called the Dauphin Collection. From the united labour of Pierre Didot and Firmin Didot, who were at the same time engravers, type-founders, and printers, subsequently resulted the beautiful publications at the national palace of the Louvre. They introduced many improvements into the typographic art. By their side and in their establishment youthful typographers were instructed, who have carried the taste for their art into the provinces and into foreign lands.

Now, however, in most countries, by the effect of competition carried to its utmost limits, the distinctive, original, and personal characteristic of the ancient typographers is becoming gradually effaced. The system of the division of labour does not permit them now, as formerly, to cut and cast the type themselves, to make their own ink, to superintend the construction of their presses, or even to take the balls from the hands of the pressmen, to show them how they should be used ; to a knowledge of these technicalities many of the ancient printers united extensive literary acquirements.

At the present day competition compels every one to concentrate all his efforts and all his aptitude upon one only of the branches which combine to form the art of typography. The engraver is merely an engraver ; the type-founder is only engaged in that branch ; so it is with the ink-maker and the manufacturer of printers' rollers, with the bookseller and the publisher, and of necessity even more so with the printer, who can only succeed in this laborious and difficult profession by dint of being above all a skilful manager. In many printing establishments, therefore, there are often two partners ; one of them occupied with the technical details of the art, the other with the commercial or administrative depart-

ment. To this arrangement, and to this extreme division of labour, must be attributed a certain uniformity which is to be observed in the productions of modern typography, and perhaps also an absence of originality. It must nevertheless be stated, that in general, and even as a consequence of this concentration of efforts upon every single branch of the art, the results are satisfactory.

The National Printing-office of France was founded in 1640 by Louis XIII., who there collected the punches cut by Garamond by order of Francis I., and confided these punches to the most eminent printers of his time, who were honoured with the title of *Royal Printers*. Under the preceding reigns this printing-office had distinguished itself by large publications, such as the collection of Ordonnances of the Kings of France, that of the Fathers of the Church and of the Councils, and that of the Byzantine Historians, &c. At the fall of royalty it became a vast establishment in which was concentrated all the printing of the government departments, divided hitherto among private printing-offices. Napoleon confided the direction of it in 1809 to M. Marcel, who had accompanied the expedition to Egypt, and had founded a printing-office at Cairo. Making use of the types of the Propaganda of Rome, which had been removed to Paris, M. Marcel printed the Lord's Prayer in 150 languages.

It was especially under the reign of Louis Philippe that the printing-office, then a royal establishment, improved its means of execution, and caused a great number of Oriental types to be engraved under the special direction of the most learned Oriental scholars, such as MM. Burnouf, Mohl, Hase, &c. All the types are remarkable for their beautiful execution and for the happy combinations which, without impairing the purity of form of characters, has simplified their cutting, and facilitated their composition. We may particularly instance the hieroglyphic character, composed of 2,400 punches, with which all the Egyptian inscriptions can be reproduced; and the Assyrian character, the decomposition of which has brought down to 100 the number of punches necessary to form its various combinations. The 150 foreign founts in the specimen-book of the National Printing-office offers an interesting subject of comparison with the rich collection of the Imperial Printing office of Austria. The Jury have particularly remarked the pure taste and perfect execution of the borders printed in gold and in colours, in imitation of the drawings and vignettes of the elegant Oriental manuscripts.

It is to be desired that the National Printing-office of France, following the example of the Imperial Printing-office of Austria, and of the manufactures of Sévres and the Gobelins in France, should successively increase its rich store of foreign type, and devote itself more especially to every kind of experiment relating to typography. The making of such experiments, which require the co-operation of learned men and of good artists, would be honourable for a nation like the French.

The typographic execution, with reference to the types, the harmony, the clearness, and the purity of the designs executed by MM. CHENAVARD and CLERGET is perfect. Nothing can be more beautiful than the three volumes of the Oriental Collection sent by the National Printing-office. These are—

- 1st. The First Book of Kings.
- 2nd. The First Volume of the History of the Mongols.
- 3rd. The First Volume of the Bhagavata Purana.

The Jury have found the bookselling business of Paris honourably represented in this exhibition by MM. RENOUARD, BAILLIÈRE, and GAUME for the sciences and literature; by MM. LANGLOIS and LECLERCQ, and by M. PAGNERRÉ, for educational works; by MM. BANCE, GIDE, and CHARLES TEXIER, for architectural works; by M. MATHIAS, for his industrial and scientific library, so suitably adapted to the wants of mechanical science; and, lastly, by Madame HUZARD, for works upon Agriculture.

Amongst other works, the Jury have remarked the edition of Hippocrates, in Greek and French, forming seven octavo volumes; and the first volume of the collection of the Greek Physicians, issued from the press of the National Printing-office. M. BAILLIÈRE is the publisher of these works, as also of the Anatomy of the Human Body by Cruvelhier.

The "Complete Works of St. John Chrysostom, and of St. Basil," with the Latin translation in juxtaposition with the Greek text, and the edition of the "Complete Works of St. Augustine," published by M. GAUME, are beautiful and honourable literary undertakings. Worthy also of mention are the *Lives of the Painters and Artists*, published by M. JULES RENOUARD; the *Monuments of Ninereh* by M. GIDE, executed at the National Printing-office; and in another class of works some books intended for scientific studies, such as the *Lessons in Botany*, by M. LEMAOUT, and the *Course of Chemistry*, by M. REGNAULT.

French printing has been honourably represented at this Exhibition; for Paris by M. DUPONT, whose extraordinary production of fac-similes,* of old books, in the style of anastatic reproductions, and whose general specimens of printing as

* Mr. Harris, so well known for his extraordinary production of fac-similes of old books, restoration of defective leaves, &c., has favoured the Jury with the following description of the means he employs. His specimens were in Class XXX., and consequently out of the jurisdiction of the Jury of Class XVII. :—

"In the history of mankind there are few things so remarkable, as that the press and the easel have been the means of producing works of art which have most conspicuously tended to the civilization of man and the unity of nations. The avidity with which these productions are sought after, up to the present time, is fully proved by the prices given either for early printed books or ancient paintings, of which the former especially are often imperfect. From this latter circumstance the collector has been induced to seek the means of having ancient and valuable works in typography and painting completed by fac-similes, and thus restoring to the present generation works which most probably in a few more years would have been buried in oblivion.

"It was about the year 1815 that I was first employed by the late Mr. John Whittaker, of Westminster, an eminent bookbinder at that period; and I believe the idea of having ancient books of the early printers, &c., perfected by fac-similes, was first suggested to him by the late Earl Spencer, for whom many books were so done; and numerous specimens are preserved of some of the rarest productions of the press in the library at Althorpe. Specimens are also to be seen in the King's Library, which were done in the lifetime of His Majesty King George III., the art of imitation by fac-simile being patronized by him, also by the late Earl Fitzwilliam, the Hon. Thomas Grenville, and many others. I continued to work for Mr. Whittaker till about 1820, when I was sent for by Lord Spencer, for whom I completed a Pentateuch in Hebrew and Chaldee, and several other works; also I was employed by the late Mr. Grenville, in whose library are numerous specimens of various works completed by me, as there are also in the libraries of many other noblemen and gentlemen by whom I have been employed during the last 30 years. It now only remains to give a brief sketch of the process employed. Formerly

exhibited, deserve particular mention; by M. DIDOT, who has raised monuments worthy of the old masters in his last three great publications—the *Thesaurus* of Stephanus, Ducange's *Glossarium*, the *Bibliotheca Scriptorum Græcorum*, all produced in a country village, the whole of the composition of the types being made by young girls; by MM. PLOX, BROTHERS, whose books, albums, vignette engravings, and woodcuts, are of great merit; by M. CLAYE, whose illustrated books are of first-rate workmanship, and whose woodcut impressions are truly beautiful;* and for the provinces, by MM. MAME,† who exhibit books neatly bound and fairly printed, at most extraordinarily low prices; by M. SILBERMANN, who has contributed to improve the art of surface coloured printing; by M. DESROSNIERS, who in a small provincial town has produced his "Ancient Auvergne," &c., in a very creditable manner; and by M. BARBAT, who exhibits illustrated volumes of the Scriptures.

PRINTING—SPAIN AND PORTUGAL.

The Jury would have been gratified to see displayed in the Exhibition any typographical production executed in Spain,—the country which in 1772 produced at Madrid the superb edition of "Sallust," printed in such perfection and on such beautiful paper by the King's printer, Joachim Ibarra.

It is in Spain that the most ancient manufactories of paper known in Europe were established.

The same feeling is to be expressed as regards Portugal, for the Jury cannot consider as a specimen of Portuguese printing the sample exhibited from Madeira, under the title of *Amostra de Imprensa*, though every beginning, however small,

"I made an accurate tracing from the original leaf, and afterwards retraced it on to the inlaid leaf by means of a paper blacked on one side; this produced an outline lettered page, which, by being gone over carefully and imitating the original, produced the desired leaf. This process was found to take up much time, and was consequently expensive, but it was the method I adopted while employed by Mr. Whittaker; and he, to carry out the deception still further, had two sets of tools cut of the large and small letters generally used by Caxton, with which he has often been at the trouble to go over the pages after my work was done, to give the appearance of the indentation of the type. The process afterwards adopted by me was to make the tracing in a soft ink, to transfer the same to a thin paper, and to re-transfer on to the intended leaf: by this means I saved one-third, or one tracing of the work, which was a great saving both in time and expense. I pursued this process for some years; but I have within the last 10 or 12 years had recourse to lithography, producing the tracing on to the stone, and finishing up the letters on the same: this has been beneficial, particularly when more than one copy was wanted; but I occasionally find even this process irksome and uncertain, and frequently at this present time have recourse to my own, or the second method described, and execute fac-similes by manuscript process. I have thus endeavoured to give a concise and clear statement of the method employed in producing fac-similes. With respect to early printing, the specimens produced by me are entirely done by hand, and are specimens of a style now little in use in water-colour painting."

* By a singular coincidence these three were pupils of the typographic establishment of M. Firmin Didot.

† According to MM. Mame's statement, they keep a stock of 1500 volumes always ready; throughout the year they produce 15,000 volumes per day, averaging 240 pages each volume. They have 20 steam cylinder machines, one machine turning out 14 reams of printed work per hour. All the wood-engraving is done in their establishment; they employ 1200 persons.

ought to be encouraged. The printers of Lisbon might have sent some well-known editions of their classics.

PRINTING—BELGIUM AND THE NETHERLANDS.

Printing was introduced into the Low Countries at the same time as into England. Martin d'Alost, in 1473, and the Brethren of *la Vie Commune*, at Brussels, published their first works. The art of printing made rapid progress in the skilful hands of Joannes de Westphalia, in 1474, at Louvain, and soon extended itself to Antwerp, Andenaude, Ghent, Bruges, Hasselt, &c. Towards the year 1554, the Plantins at Antwerp, and, in 1616, the Elzevirs, first at Leyden and afterwards at Amsterdam, carried the typographic art to such a degree of perfection, that their publications are still sought after throughout the whole of Europe. The Wetsteins, the Blaeuwa, and the Moreti (who, being ennobled, received permission to continue the art of printing without derogation to their nobility), were emulators and successors worthy of them. The political events of the 17th and 18th centuries had a baneful influence on the progress of typography, which revived, particularly in Belgium, in 1815. The number of able printers increased considerably in both countries; and, since 1830, Belgium has witnessed with satisfaction the annual increase of original publications, notwithstanding the unfavourable position in which the publishers are placed from the competition of the reprints of foreign works. Such, however, is the influence of the development of a national spirit, that, during the last twenty years, the Belgian press has issued a greater number of original works than in the 150 years which preceded the recognition of the independence of the country.

Amongst the printers of Belgium, where the mechanical part of the art is good, the town of Malines has long since made itself known by its Prayer and Liturgic Books, successfully and economically printed in red and black—thanks to the incessant labours of M. P. T. HANICQ. Typography is also represented in the Exhibition by the well-printed Bibles and Testaments of M. BRIARD, of Ixelles; the illustrated books and woodcuts of M. TAMAR, an art recently cultivated in Belgium; the Missals of M. WESMAEL LEGROS, of Namur; the cheap publications of M. CASTERMAN, of Tournay; the Academical Collections of M. HAYEZ, of Brussels; the Statistical Tables of the Population and Agriculture of Belgium of M. LESIGNE; the *Album de Pomologie* of M. PARENT; the Specimens of illustrated Works of M. MUQUARDT; and the Collection of Letters and the Historical Initials of M. JACQMAIN, of Ghent.

Few printers of the Netherlands have sent specimens of their productions. The neat and cheap Bibles of MM. ENSCHÉDÉ JOHANNES, and Sons; the curious Journal of the Embassy of the Earl of Portland in France, printed by M. NOORDENDORP, at the Hague; and the "*Graduale Romanum* and *Antiphonarium Romanum*," by M. ZWEESSAARDT, of Amsterdam, have been remarked by the Jury.

We will also mention the continuation of the voluminous publication of the "*Lives of the Saints*," commenced by Bollandus, and forming 53 volumes in folio. The first of these enormous volumes, printed in 1845, is entirely devoted to the Life of St. Theresa. It is satisfactory to know that this great enterprise, supported by the Belgian Government, is to be continued, as it equally embraces religion, history, and geography.

PRINTING—DENMARK.

The Jury have not been able to judge of the state of printing in Denmark, that country not having sent a single printed book. There was only an ingenious machine for composing the types after an entirely new system.

PRINTING—SWEDEN.

M. BROLING, the printer to the Bank of Sweden, exhibited specimens of printing bank-notes by letter-press, of superior merit from their varied combinations, brightness of colour, good register, and the difficulty thrown in the way of forgery by the different processes employed.

PRINTING—RUSSIA.

A single broadside sheet from St. Petersburg exhibited specimens of several Russian and Oriental characters surrounding a vignette on wood, representing varieties of the Russian people. The whole is neatly printed.

PRINTING—GREECE.

It is to be regretted that the typographical productions of Greece were not exhibited amongst those of other civilized nations. A printing-office was established at Athens at the time of the independence of Greece.

At this Exhibition, Greece has confined herself to inscribing upon her banners, in large letters, the following sentences from her ancient poets as the harbinger of a better future :—

Ουποστὲν χροὴ τὰχ' αἰθρὴν ἴσσοι' ἄμεινον.
 Ζηλοῖ δὲ τι γένονα γένων
 Εἰς ἄμενον σπύσσουσ'. Ἀγαθὴ δ' ἔπει ἥτις βροτοῖσι.

PRINTING—PERSIA.

Europe might have possessed the art of printing ever since the year of our Lord 1310, had she been acquainted with a work by Râchid-ed-din, who, as far back as that period, had described the process of printing as known to the Chinese, in his Persian work entitled *Djemma'a et-teaurikh*.

Persia has only sent to the Exhibition some beautiful manuscripts, and some books printed in Europe; nevertheless the typographic press is not unknown in that country, since a newspaper in the Persian language is published there.

PRINTING—EGYPT.

Whilst at the present day the ancient languages of Egypt are printed in Europe with hieroglyphic, Coptic, or Greek characters, it was interesting to see displayed in the Exhibition in London, a hundred and sixty-five volumes of all sizes, printed in Arabic, in Turkish, and in Persian, at Cairo (the ancient Memphis).^{*} Amongst these books, we have remarked some which are enriched with arabesques tastefully executed by means of typography. These are printed upon a peculiar paper,

^{*} At Boulac, a suburb of Cairo.

manufactured at Boulac, by the old vat process. The pulp appears to resemble that which is obtained in China and in India by the use of raw materials, such as the bamboo and the banana tree. It may be that the ancient papyrus is now reappearing in Egypt under this new form. Amongst the Arabian books devoted almost entirely to military science, medicine, geography, and education, the Jury have remarked *The History of the Kings of France contemporary with the Sultans of Egypt*; *The History of the Ottoman Empire*, by Wassef; *The Advantages of War in a Religious Point of View*; and in translation, the *Geography of Malte Le Brun*; *The Treatise of Good Advice*; *On the Care of Little Children*; *The Children's Friend*, by Berquin; *Tom Thumb*; and lastly, *A Journey in America*, with a few engravings, also executed at Boulac.

PRINTING—UNITED STATES OF AMERICA.

It is well known that there are some works printed in the United States which give a more favourable idea of the productions of America than those which have appeared at this Exhibition. The American printers have contented themselves with sending a number of newspapers, the printing of which is not remarkable. Even the lowness of price has nothing surprising in it, as there is no stamp duty, neither is there any tax upon paper.

PRINTING—CANADA.

In the collection of articles exhibited by Canada, we have observed a specimen book containing a large number of beautiful types from the foundry of Mr. PALSGRAVE, at Montreal. He also exhibits some stereotype plates.

PRINTING—AUSTRALIA.

The Jury have examined, with real interest, several works printed in Van Diemen's Land, at Hobart Town, some of them by HENRY DOWLING, such as the *Tasmanian Kalendar* and the *Tasmanian Journal*, in 8vo; and two large volumes, accompanied by lithographs, likewise designed and printed in Australia; and the execution of which is satisfactory.

The same may be said of the *Arts and Ordinances of the Governor and Council of New South Wales*, printed at Sydney, in 1844, by Mr. WILLIAM JOHN ROW, with types cast at Sydney.

It is to be regretted that, introduced as it now is even to the confines of the earth, all the productions of the press have not been represented in this universal gathering; for printing is a gift almost as necessary to man as speech, for the manifestation of his thoughts.

New Process relating to Galvanoplastic, Galvanographic, Galvanoglyphic and Chemotypic Printing.

The Imperial Printing-office of Austria has exhibited the whole collection of the new applications of the typographical art, such as the galvanoplastic process, galvanography, galvanoglyphy, and chemitypy, which, bringing their co-operation to the aid of typography, enable it to reproduce, in some degree, nature itself. It

may therefore be said that these new branches are to typography what photography is to the art of drawing.

The Galvanoplastic Process.—We have, for instance, seen antediluvian fishes reproduced upon paper, at this Exhibition, with the exactness of nature itself. By means of successive layers of gutta percha applied to the stone inclosing the petrified fish, a mould is obtained, which being afterwards submitted to the action of a galvanic battery, is quickly covered with coatings of copper, forming a plate upon which all the marks of the fish are reproduced in relief, and which, when printed at the typographic press, gives a result upon the paper identical with the object itself.

M. HULOT, a mechanist and chemist attached to the Mint of Paris, has exhibited some sheets, each of them containing three hundred heads intended for *postage stamps*, which are impressed at one stroke, from a plate of brass of a single piece, containing these three hundred figures in relief. By a peculiar process, M. Hulot succeeds in identically reproducing, without the least contraction, the original engraving, which is on steel, but which might be engraved on any other metal, or even on wood. It is by this same process that M. Hulot has reproduced, for the Bank of France, the notes engraved in relief in such perfection by French artists.

Galvanography.—The Austrian Printing-office has shown us some remarkable results of this process. An artist covers a plate of silvered copper with different coats of a paint composed of any oxide, such as that of iron, burnt terra sienna, or black lead, ground with linseed oil. The substance of these coats is of necessity thick or thin, according to the intensity given to the lights and shades. The plate is then submitted to the action of the galvanic battery, from which another plate is obtained reproducing an intaglio copy, with all the unevenness of the original painting. This is an actual copper-plate, resembling an aquatint, and obtained without the assistance of the engraver.

Galvanoglyphy.—The experiments in galvanoglyphy are no less interesting. Upon a plate of zinc, coated with varnish, a drawing is etched; then, with a small composition roller a coat of ink is spread upon this varnish and left to dry. The ink is deposited only on those parts where the varnish has not been broken through by the graver, and leaves the sunken portion of the engraving free. When the first layer is dry, a second is applied, then a third, and so on, until it is considered that the original hollows are deep enough. The plate thus prepared is placed in the galvanic battery, and another plate is the result on which all the hollows of the engraving are reproduced in relief. This relief is more or less raised, according to the number and thickness of the coats of ink successively applied. The process was invented in England, and patented by Mr. Palmer, of Newgate Street.

Chemotypy.—For the purpose of obtaining casts in relief from an engraving, the process of chemotypy is equally ingenious. A polished zinc plate is covered with an etching ground; the design is etched with a point and bitten in with dilute aquafortis; the etching ground is then removed, and every particle of the acid well cleaned off. For this purpose the hollows of the engraving are first washed with olive oil, then with water, and afterwards wiped, so that there may not remain the least trace of the acid. The plate, on which must be placed filings of fusible metal, is then heated by means of a spirit-lamp, or any convenient means, until the fusible metal has filled up all the engraving; and when cold, it is scraped

down to the level of the zinc plate, in such a manner that none of it remains except that which has entered into the hollow parts of the engraving. The plate of zinc to which the fusible metal has become united is then submitted to the action of a weak solution of muriatic acid, and as of these two metals the one is negative and the other positive, the zinc alone is eaten away by the acid, and the fusible metal which had entered into the hollows of the engraving is left in relief, and may then be printed from by means of the typographic press.

Paneiconography.—This is a new process, invented by M. GILLOT, of Paris, and consists of a method of reproducing, by means of the typographic press, any lithographic, autographic, or typographic proof, any drawing with crayon or stump, or any engraving upon wood or copper.

Upon a plate of zinc, polished by means of pumice-stone, the artist executes the required design with lithographic crayon or ink, or transfers impressions from lithography, wood-engraving, or copper-plates. The surface is then inked over with a roller, so as to increase the thickness of the ink, which is afterwards consolidated by dusting finely-powdered rosin over the plate, by means of a pad of wadding: the rosin adheres only to the ink, and is readily removed from the other parts of the plate. Afterwards, for the purpose of obtaining a relief block, the plate is placed on the bottom of a shallow trough, containing very dilute sulphuric or hydrochloric acid. By means of a rocking motion given to the box, which for that purpose is fastened to an axis, the acid is caused to pass slowly and continuously to and fro over the surface of the plate. After the lapse of half an hour, if it be a crayon drawing, the etching is completed, and a relief block is obtained, in which it is only necessary to remove the large *whites* by saw piercing. In case, however, of the plate containing written matter, or many very fine lines, it is necessary to withdraw it from time to time, and again ink the surface with lithographic ink, and dust the powdered rosin, so that the edges may be protected as much as possible from the undermining action of the acid; these operations must be repeated until the necessary depth is obtained. Transfers may be made from very old impressions of wood-engravings by sponging them several times at the back with acidulated water, and then operating as is usual with lithographic transfers.

Music Printing.—As early as 1490 music was printed by letter-press. The edition of the Psalms, printed at Mayence in 1490, had the music (*plain chant*) in two colours, the notes being in black and the ledger-lines in red. The shape of the notes in this edition is different from the square notes subsequently adopted for sacred music. The notes of the music executed by Peter Hautin, an engraver, type-founder, and printer, were lozenge-shape, and each note was cast separately with the ledger-lines. Peter Attaignant, of Paris, printed, in 1530, twenty-nine songs with this description of music. In 1552 Adrian Leroy, musician to Henry II. of France, and Robert Ballard, his brother-in-law and partner, obtained the title of King's printers for music. The types were engraved by William Le Bé, an eminent artist of that period, and were on the same plan as those of Peter Hautin.

In 1579, Angelo Gardano printed in Venice, from music types, the "*Madrigali à sei voci di Sabino.*" The process was the same as Peter Hautin's, but the execution was very inferior. The opera of "*Thésée*," the music by Lulli, was printed by Ballard in 1688; the typographical execution was imperfect. The same work, in folio, was printed in 1720, by Beauscune, from copper-plates, and was so

superior to the music printed from types that the old method was abandoned for that of printing from engraved plates. The exclusive privilege granted to Ballard was maintained in his family without opposition until 1639, when Sanlecque, another engraver in Paris, obtained letters patent from Louis XIII. of France for a ten years' sole right of printing the *plain chant* music by a new process of his invention. In consequence of this patent, copper-plate music printing superseded typographic music printing as early as 1675. In 1746, M. Dornel, organist of the church of Ste. Geneviève, Paris, entered into partnership with M. Klehin, an engraver and type-founder, for the purpose of casting music types in sand. By this kind of stereotyping the printing appeared to possess some advantages, but the plan was abandoned. In 1764, M. Breitkopf, a type-founder and printer at Leipzig, succeeded in casting music types. The electoral Princess of Dresden was so much pleased with his plan that she gave him to print the music of a drama of her own composition, called "*Il Trionfo della Fidelta*." In this type music the notes were each composed of separate pieces; and in Germany until then there had been only one piece for each note and ledger-line. The system of casting music with the notes separately possessed some advantages, although the composition was tedious and the founts costly. At the same period MM. Enschédé, of Haarlem, caused M. Feischman, an eminent artist employed in their foundry, to engrave music types, the perfection of which has scarcely been surpassed; but the system which they adopted was too complicated for general use. In 1762, M. Rosart, of Brussels, being desirous of diminishing the number of pieces, cast a new fount of music with only 300 separate sorts. M. Fournier, jun., further improved the casting of music types by reducing the number of types to 160. At the sitting of the Royal Academy of France in August 1762, these improvements were noticed favourably.

M. Reinhard, of Strashurg, obtained a patent for a new process of printing music; he printed the ledger-lines from surface engraved plates, and the notes from moveable types. The work was good, although the notes were of different tint from that of the ledger-lines in consequence of the two printings. About 1810, M. Olivier, a French engraver, produced beautiful moveable music types, but the mechanical difficulties of setting up rendered this plan useless. In 1832, M. Duverger, of Paris, invented an ingenious mode of casting the notes separately from the ledger-lines. M. Duverger's plan was to compose a page of music without the ledger-lines, he then took a plaster cast, and with the aid of a straight edge he ruled lines in the plaster with a graver to the same level as the surface of the notes; he then cast stereotype plates, and thus obtained perfect music pages for surface printing. MM. Tanterstein and Cordel, pupils of M. Duverger, invented another method of producing music; they set up the music with moveable types combined with the ledger-lines; they then took plaster casts, and simply repaired in the plaster the imperfections in the ledger-line joints, previous to stereotyping. Good specimens of this system were in the Great Exhibition.

The music types of Messrs. SINCLAIR, of Elinburgh, did not possess any novelty, but their execution was good.

M. DERRIEZ, of Paris, is the only exhibitor of music types showing any marked improvement. The notes were cast either in one or more pieces, so as to admit of the ledger-line crossing the notes when they were required to be on the line. Each

ledger-line was in one piece, and of the full width of the page, either in brass, zinc, or hard type metal. Music printed from such types is a nearer approach to impressions from engraved plates than any hitherto produced, yet it is doubtful whether by continued wear the interstices may not become visible, and render this system imperfect.

Notwithstanding the many attempts for the improvement of music types, several difficulties have yet to be surmounted before music printed by letter-press can equal that which is printed from engraved plates. Good work is produced by transfers of engraved music on lithographic stones, although the cost of printing is greater than by letter-press.

Punch-cutting and Type-founding.

In the earliest books printed in Germany the shape of the letters was at first Gothic; they were then rounded and became semi-Gothic. In Italy, under the influence of the Roman inscriptions and of the beautiful manuscripts of antiquity, their form was completely changed. A Frenchman, Nicholas Jenson, engraver to the Royal Mint of France, was sent to Mayence, in 1462, by Louis XI., to learn the secrets of the new-born art of printing. Civil commotions having prevented him from introducing this art into France, he engraved in Venice, for the printing-office which he there established, the beautiful types of Roman characters which Garamond afterwards took for his models, and from which models it is scarcely possible to depart without falling into extravagance or bad taste.

In England, Caxton adopted, for printing his works upon chivalry, a style of letter in imitation of the handwriting of that period. Antoine Verard printed his works in France at the same period with types very similar, but better cut and better cast. Both seem to have been desirous of giving *fac-similes* of the manuscripts of their times.

The Roman characters adopted by the Aldi and by the Stephani caused the semi-Gothic shapes to fall into disuse; and it was the elder Aldus who invented the *italic* character, which was engraved by Francis of Bologna after the beautiful writing of Petrarch.

The Elzevirs employed for their works types engraved by Garamond and Sanleques.

Ibarra in Spain, Baskerville in England, and Enschedé in Haarlem, modified the form of the types in accordance with the then prevailing taste. Of these the letters engraved by Enschedé and Fleischmann, at Haarlem, are very remarkable specimens.

At the close of the last century the younger Fournier, a punch-cutter and type-founder, caused some improvements to be made in this art, which he has described in his *Manual*.

M. Firmin Didot, who engraved the types used by his father for his beautiful publications, exerted himself for the purpose of imparting to types of all descriptions the highest degree of elegance. Nothing can be more perfect than his punches for the edition of Racine's works printed at the Louvre; and the types, in imitation of handwriting, are masterpieces. Some years later M. Henry Didot engraved small types called *microscopic*, which were used in printing the edition of the

Maxims of La Rochefoucault and the works of *Horace*. The types are extremely small, and presented great difficulties both in the casting and in the engraving.

In 1823, M. Louis John Pouchée took out patents for the three kingdoms for a machine for casting type, consisting of a mould formed by a combination of steel bars with grooves and matrices, secured by a frame and a brace of iron upon a strong wooden bench, and a lever carrying a heavy rammer, to fall down into the mould, for the purpose of forcing a portion of the fluid type metal, which had been poured out of a ladle into the receptacle between the ends of the grooves (each groove forming the mould of a separate type), through small apertures into the grooves and matrices (placed at the opposite end of the grooves) where the body and face of the letter are cast. By this apparatus about 200 types may be cast at one operation, and the casting repeated twice in a minute, or even quicker. M. Pouchée, having cast a large quantity of type by this machine, offered the type for sale, and the printers refused to purchase unless at a reduced price; M. Pouchée preferred melting it. At the sale of M. Pouchée's type-founding effects, a quantity of this machine-cast type (which had escaped melting) was sold, and was afterwards discovered to be machine-cast by a private mark on the side, and an after-cut nick. The machine was not offered for sale. But Mr. Reed, a printer in King Street, Covent Garden (related to Mr. Blake, of the firm of Blake and Stephenson, type-founders at Sheffield), was employed by the type-founders to negotiate with M. Pouchée for the purchase of the machine, which was effected for about 100*l*. The machine was conveyed to Messrs. Caslon and Liversmore's and destroyed, on which condition it was purchased. There was included in this purchase a valuable planing-machine, and a cross-cutting machine for cutting the grooves. It was the invention of M. H. Didot, to whom M. Pouchée paid 48,000 francs for the patent right in England.

The English punch-cutters, whilst retaining elegance in their types, endeavoured to make them more durable, and perhaps more legible, by strengthening the fine strokes and giving a greater slope to their punches, thus obtaining a higher degree of perfection. It must be remarked, nevertheless, that in all their specimen-books the engraving of vignettes and borders has made little progress, and contrasts unfavourably with the beauty of their types. The same remark applies to Germany. In France some degree of taste has been applied to ornaments of this species. Latterly, the caprice of fashion has caused the shapes of the letters to be elongated, widened, and made either thin or thick, according to the whim of each engraver. It is the same with the fantastical types fitly designated by the name of *fancy letter*, which are carried to absurdity, in order to attract attention by their very eccentricity.

Mr. Whittingham, at the suggestion of Mr. Pickering, first reintroduced the old letters of Garamond and Jenson, and many of the London printers have since followed; some very beautiful works have already been printed with these old letters, so true it is *there is nothing new in this world except that which is old*. This saying applies also to the manufacture of paper, for in place of the beautiful paper called *vellum*, the evenness of which is perfect, the English public at the present day give the preference to *laid papers*, though these show the wire-marks of the moulds as much as at a period when the weaving of wire was not thoroughly understood.

Since the invention of casting types by Peter Schoeffer—a process which goes back as far as the origin of printing itself—this art has made little progress. It was only at the commencement of the present century that a slight improvement resulted from the use of the mould called the American mould, which renders the work of the founder somewhat more easy.

In 1806, M. Firmin Didot invented the sloping mould, with a salient and returning angle, and by an ingenious division of the letters of the alphabet, and their various combinations, succeeded in imitating English handwriting, which presented the greatest difficulty, and in completely doing away with the inconvenience of leaving the separation between each letter visible, an obstacle which had till then prevented the success of every attempt of this description. The types cut by him and by his son were a real progress in the art, and met with great success in Europe. Copper-plate engraving and lithography alone can vie with the perfection of this system.

About the same period, M. Henry Didot invented the compressing mould, and afterwards the mould which he named the *polyamatype*—by means of which a hundred and forty letters are cast at once. M. Marcellin Legrand, the successor of M. Henry Didot, has exhibited the products of this mould, which requires great accuracy and great care in order to give successful results. In spite, therefore, of the advantages which it offers, it is only in his establishment that it has been applied on a large scale with success. Some years since the use of mechanical moulds, moved first by hand (soon superseded by steam power), was introduced from the United States, where this invention originated, into Germany, England, and France. Germany has been able to turn this invention to better account than either England or France: the cause of this may perhaps be, that in the German alphabet the extremities of the thick strokes of the letters are not terminated by sharp lines intersecting each other at right angles, and which, exposing the least unevenness in *running*, constitute at once the merit and the difficulty of type-founding.*

We had an opportunity at the Exhibition of seeing M. Brockhaus' mechanical mould, which he has employed with success for a long time in his own printing-office and in that of M. Didot. In the one the movement of the platten of the mould acts horizontally, and in the other vertically. The injection of the melted material is accomplished in each by means of a piston working in the metal pot, and driving the material briskly into the mould.

In 1844, M. Marcellin Legrand exhibited in Paris a series of 4,600 punches, and the same number of matrices, for the purpose of reproducing all the signs representing the words of the Chinese language. This system, which consists in adding to the piece representing the *key* another piece which modifies it, has completely succeeded, for it has been adopted not only in America, but in China itself, and at the present moment works are printed at Macao and at Ning-Po with the types engraved by M. Legrand. We have seen in the Exhibition the Gospels printed in China by the Presbyterian Missionary Society of America. M. Marcellin Legrand was the first to undertake singly this immense labour, by means of

* There may be other reasons; for it is well known that the invention patented in this country could be successfully worked. Messrs. Figgins, who purchased it, have abstained from putting it in practice, probably in deference to the journeymen type-founders.

which Chinese writing is brought within the compass of European typography. A printed table, in which each word is accompanied by a cipher, is now sufficient to indicate to the workman the cipher corresponding to the word. Each of the types is arranged in the case in numerical order, and bears upon its side a number corresponding with that of the table, thus facilitating the manual labour, and preventing many errors. There was also in the Exhibition a page printed in Chinese types, engraved by M. Auguste Beyerhaus, of Berlin. By means—1st, of 1,200 punches and matrices capable of combination; 2ndly, of 2,800 characters, each engraved in a single piece; 3rdly, of 105 others, called *perpendiculars*, he composes 25,000 different characters. The characters in this system are always divided perpendicularly, whilst in that adopted by M. Marcellin Legrand, some of the divisions are perpendicular and others horizontal. This system, judging of it by the printed page displayed at the Exhibition, appears to be successful. In point of execution, it leaves nothing to be desired; and Mr. William Wells, an accomplished Chinese scholar, residing in that country, has bestowed great praise upon it.* M. Beyerhaus has also engraved an Egyptian type, at the suggestion of M. Bunsen. The characters of it are open, whilst the two founts which the National Printing-office of France has had engraved are black (*en silhouette*).

The Imperial Printing-office of Austria, decomposing each part of a Chinese word into as many pieces as it contains strokes of the pen, reconstructs the words by means of these little pieces, which the compositor groups together so as to construct any Chinese word. The number of *points* and *strokes* is about 400, and they appear to be a most complete system of Chinese typography.

Nearly all the languages of the world were typographically represented either in the specimens of the National Printing-office of Paris, in the numerous tables of the Imperial Press of Austria, in the Bibles printed in almost all languages by the Bible Society, in the specimens of general type-founding at Paris, in those of M. Decker, of Berlin, or in those of the English founders, and especially in those of the late Mr. Watts, of London, who has himself engraved an extensive series of Oriental types, which are an honour to his type-founding, and form the richest series of this kind existing in any private establishment.

Amongst all the types which express the gift of speech, the most numerous and complicated are those of the Chinese language, in which every idea and each word is represented by a different character. Owing to typography, there will soon be no single idiom which may not be saved from oblivion; for typography contributes to the preservation of languages as essentially as did the press of Guttenberg to the preservation of books at the time of its discovery.

The Jury have, in this important branch of art, remarked the productions of the following contributors:—

England.—Messrs. CASLON and Co. exhibited a great variety of beautiful types; Messrs. SINCLAIR, DUNCAN, and SON, specimens of general excellence; Messrs. FIGGINS, types of great excellence and beauty; a super-royal form containing 220,000 pieces of pearl type, locked up, and showing the care bestowed in finishing, in order to insure correct justification; and a specimen of curious and newly-cut Tudor type, imitating the inscriptions from monuments and tombs; Messrs.

* M. Beyerhaus has made a smaller type, which is also very well executed.

MILLER and RICHARD, a specimen of ruby type, in which "Gray's Elegy" is printed, thirty-two verses in two columns, occupying 3½ inches in length; Messrs. BESLEY and Co., a great variety of beautiful and original types, among which a complete series of Elizabethan, or church text, as well as the typographical ornaments taken from the remains of Nineveh and Etruria. The Jury also mention the specimens of Messrs. FERGUSON BROTHERS, of Messrs. STEPHENSON, BLAKE and Co., and a curious fount of complicated type of the cuneiform character, used in the Babylonian inscriptions exhibited by Messrs. HARRISON and SON. Messrs. KING's new music presents an improvement, the result of having very few kerned types. Mr. ARMSTRONG's illustrated music offers no peculiar character.

France.—M. DERRIEZ, the eminent punch-cutter and type-founder, exhibited types and flourishes of first-rate merit, and music types with separate ledger-lines running the whole length of the line, in brass or other metal, a great improvement on the ordinary music types. M. GAUTHIER's neatly cut and cast letters deserve mention. MM. LABOULAYE and Co. (successors to Didot) have shown great skill in their printing types. M. ROUSSEL exhibits music composed with moveable types and matrices, in which there appears to be no marked novelty.

Russia.—M. RÉVILLION has shown good specimens of Greek, Oriental, and other types.

Sardinia.—The Jury have remarked MM. FARINA's small punches and types.

Holland.—MM. ENSCHÉDÉ and SONS maintain the reputation of their old establishment for good printing types and stereotype plates.

Germany.—Besides the Exhibitors whose merits have already been noticed, M. DRESSLER, of Frankfort, exhibited types said to be of new metallic composition; M. SCHELTER, of Dresden, a variety of printing types; and M. HAENEL specimens of types, brass types for bookbinders, electrotpe matrices for casting large types, and electrotypes from woodcuts, all possessing merit.

Type-founding in the United States.

Before the separation of the American colonies from the mother-country, paper, printing-presses, and types were almost all imported from England. Christopher Sower, who established a printing-office at Germantown, near Philadelphia, in 1735, was the first who cast his own types. In 1768, Mr. Mitchelson attempted to set up a foundry in Boston, and the same year Mr. Buel another in Connecticut, but neither of them were successful. Soon after the close of the American War, however, Mr. John Baine, of Edinburgh, established a type-foundry at Philadelphia, and he was, it is believed, the first who regularly carried on the business of type-founding in the United States. But the importation of British type, and the small number of newspapers, still constituted difficulties in the way of success. Baine died in 1790, and his partner returned to Scotland. About this time Mr. Archibald Binny and Mr. James Ronaldson established another foundry at Philadelphia, unconnected with any other business, and were eminently successful. In England, at this time, the assortments of type in the foundries were about twenty in number, of which the largest was the twelve-line pica, and the smallest the diamond, of 202 lines to a foot. The assortments of Messrs. Binny and Ronaldson at first embraced only the more essential founts, such as brevier, bourgeois, long primer, small pica, pica, and two-line letters. At this period the increase of printing in the United

States was most extraordinary. The number of newspapers in ten years from 1790 increased from 70 to 200, and the number of offices for miscellaneous printing exceeded 50. The printing business in these ten years increased probably threefold. There was, of course, a corresponding increase in the business of type-founding: and before long Messrs. Binny and Ronaldson's assortment became as extensive as in the chief foundries of England. It is to them the world is indebted for the first real improvement in type-founding since the days of Peter Schoeffer. This important improvement was in the type-mould, by means of which a caster could cast 6,000 types in a day as easily as he could have accomplished 4,000 by the old process.

About the beginning of the present century the invention was introduced into Europe, and is now generally known as the *American Mould*. Messrs. Binny and Ronaldson's type was considered good at that time; with it Dobson printed the first American edition of the *ENCYCLOPÆDIA*, in 21 large 4to volumes, 1798-1803. About the year 1805 another type foundry was set up in Baltimore, by Samuel Sower and Co., which contained some of the moulds and matrices used by the Christopher Sower mentioned above, who cast his own type in Germantown in 1740. They were chiefly for German letters. To these were now added a variety of excellent Roman and Italic types, and among others the diamond with a smaller face than had ever before been cast either in Europe or America. Nearly about the year 1805, Messrs. White and Wing established a foundry at Hartford, in Connecticut, where they devised and used a plan of their own for casting twenty or thirty letters at a time, and are said to have brought their invention to a useful degree of perfection. On Mr. White's removal to New York, in 1811, when he established the first regular and extensive foundry in that city, this invention seems to have been abandoned, and the old plan of casting by single letters was pursued, as it is to this day. Thus we see that in 1811 there were four foundries in the United States. During the preceding ten years the newspapers increased from 200 to 360, of which 27 were daily papers. It is estimated there were at least 500 printing offices in the country; indeed so great was the demand for type in 1811 that it advanced in price 25 per cent. on what it cost in 1806. In 1813, Messrs. D. and G. Bruce established another foundry in New York, which soon became a stereotype foundry, of which we shall speak in another place. In 1818 and within a very few years after, type and stereotype foundries were set up in Boston, Cincinnati, Buffalo, St. Louis, Louisville, &c. The business soon became overdone, and the price of type receded to the old standard of 1806, and caused many failures.

In 1828, Mr. William M. Johnson took out a patent for the invention of a machine for casting type, by which he was enabled to give a sharper outline and better face to the letter by using a pump to force the liquid metal into the mould. This idea subsequently underwent many modifications and improvements by different individuals. Several patents for improvements in the machinery for casting printing types have been issued within the last ten years, so that at present all obstacles to this mode of producing types seem to have been surmounted, and this practice is now in general use—in large establishments chiefly by the aid of steam. By these improvements three times the quantity of type is produced by a caster in a day that was cast by Binny and Ronaldson's improved mould, and five times the quantity

that was produced by the hand-mould half a century ago. On the first of June 1850 there were 2,800 newspapers in the United States, with an average circulation of 1,785 copies, giving the enormous aggregate of 422,600,000 copies printed annually. There were 350 daily and 2,000 weekly newspapers. The whole number of printing-offices is now not less than 4,000. Hence the demand for printing types is constantly and rapidly increasing. There has been a corresponding increase in type and stereotype foundries. There are now four foundries in Boston, seven in New York, three in Philadelphia, one in Buffalo, one in Albany, two in Connecticut, one in Baltimore, and one in St. Louis. These twenty establishments give employment to about 800 persons, and produce daily 4,400 pounds of type. By the recent improvements in machinery, type is at present produced at a cheaper rate by 25 per cent. than in 1841. These twenty foundries supply not only the United States, and a great part of Canada, but export largely to the British, Spanish, and Danish West India islands, Mexico, and South America. The exports of printing-presses and types, for the year ending June 1851, amounted to 71,401 dollars. The quality of the American type will, it is said, bear a favourable comparison with that of Europe, and it is cheaper. The metal used is a mixture of lead, antimony, and tin, in proportion to the kind of type required. The average of lead is 75 per cent.

A statement of the prices of types for the last half-century may be interesting, we therefore give a table of them from the last Official Report, naming only some of the principal sorts.

NAMES OF BODIES.	1801	1806	1811	1819	1827	1831	1841	1850	1850
	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.	In English currency.
Pica - - -	•35	•44	•55	•44	•42	•38	•38	•30	s. d.
Small Pica - -	•40	•48	•58	•48	•46	•38	•40	•32	1 4
Long Primer - -	•47	•56	•66	•56	•50	•40	•42	•34	1 5
Bourgeois - - -	•56	•66	•76	•66	•58	•46	•46	•37	1 6½
Brevier - - -	•67	•76	•86	•76	•70	•56	•54	•42	1 9
Minion - - -	-	1•03	1•13	1•00	•88	•70	•66	•48	2 0
Nonpareil - - -	1•12	1•40	1•75	1•40	1•20	•90	•84	•58	2 5
Agate - - -	-	-	-	-	1•44	1•10	1•08	•72	2 11
Pearl - - -	-	-	-	-	1•75	1•40	1•40	1•08	4 5½
Diamond - - -	-	-	-	-	-	-	-	1•60	6 7½

The application of electrotyping to the formation of matrices is another improvement deserving mention, inasmuch as it saves much labour and tends to the reduction of price. The process is probably the same as that employed in England and France, but in America it is much more extensively used, in consequence of no law of registration being in existence there as in the former countries. It is found that the Patent and the Copyright Acts do not reach this case, as there is no date-mark on the type to identify it. The consequence is, that the moment any new or improved letter or ornament is produced either in Europe or even in the United States, it is at once electrotyped and reproduced by all the other founders. This seems unjust, although it tends to render the types more uniform throughout the country.

A patent has very recently been granted—10th December 1850—to Mr. George Mathiot, for an ingenious device for preventing the electrotype cast from adhering to the original plate. Many ways have been tried to obviate this diffi-

culty, but the present is considered to be a decided improvement upon them. On the 20th of August 1850, a patent was granted to Mr. Luke Vander Van Newton for a new process of plating or coating the surface of metallic printing types, stereotype plates, and other printing plates, whether cast or engraved, with an additional coat of metal by means of galvanic electricity. This process of coating types with copper is asserted to be of great practical utility, and is said to add much to the durability of the types.* We are indebted to Mr. Ewbank's Official Patent Office Reports for 1851 for most of the facts stated.

Among the American exhibitors of types were Messrs. HOBART and ROBINS, of Boston; and Mr. T. TOBIT, of New York; the latter exhibited combinations or logotypes, which he states are unequalled for rapid composition, although it is well known that in the "Times" newspaper office they were disused many years since, as presenting no advantages over separate or single types. Lord Stanhope also tried logotypes without greater success.

Stereotyping

Is one of the means for making fac-similes in type-metal of pages of types, woodcuts, &c., for surface printing. At the commencement of printing, the idea of stereotype must have occurred from seeing the reproductions in relief of legends upon bells cast in the middle ages; it is probable, however, that many attempts failed from the imperfect means used. As early as 1735, all the pages of Bibles in German and French, set up in moveable types, were kept standing by many printers. In the last century Samuel Luchtmans obtained plates by a process of *clichage*, from which he was enabled to print. About 1700, Valleyre printed in Paris some almanacs and pamphlets which he had obtained by casting. In 1725, Mr. William Ged, a goldsmith in Edinburgh, produced some stereotype plates from which he printed, in 1739, an edition of Sallust, but his process was little encouraged, and it was abandoned after his death, although those that opposed his method did not scruple to use his plates. In 1729, Mr. Ged entered into partnership with Messrs. James and Fenner, of London, for the purpose of carrying on the stereotype business. In 1782 Mr. Tilloch joined Messrs. Foulis, of Edinburgh, for the same purpose. In 1784, M. Hoffman, of Alsace, France, succeeded in obtaining stereotype plates from moulds of clay mixed with gelatine. He printed a work entitled "*Récherches Historiques sur les Maures par Chenier*," in 3 vols. 8vo; but the process was found imperfect, and was soon afterwards abandoned. In 1791, M. Carez, of Toul, a printer, conceived the plan of attaching to a heavy piece of wood suspended from a beam, a page of moveable types, well-locked with screws, in a proper frame, with the face downwards, and letting it fall sharply on lead in a state of fusion, just when on the point of setting; he thus obtained good matrices, which were used to make relief stereotypes by attaching these matrices to the piece of wood as already described, and letting it fall on fusible metal when also just on the point of setting. Good plates were obtained; but it often happened that the types were melted when the lead was too hot, or bruised when too cold. This mode of stereotyping was therefore abandoned, and yet the plan of polytyping, carried on to this day, is not very dissimilar, although the use of more perfect

* Messrs. Orchard, Willis, and Co., of London, are the patentees for the United Kingdom, and for France, Belgium, and Holland.

machinery and different metal has much simplified the process, and rendered it less destructive to the types.

Profiting by these various attempts, M. Firmin Didot conceived the idea of casting types in very hard metal, composed of 30 parts of lead, 30 of antimony, 30 of tin, and 10 of copper. He gave to these types less height than their solidity might be increased; then, by means of a fly-press, he pressed each page (composed of these hard types, strongly fastened together in an iron box) into a plate of pure lead. The plate or matrix of the page thus obtained was affixed to the under side of the hammer of a stamping press, on the bed of which was placed in a papercase an alloy, still in a state of fusion, similar to that used for ordinary types, and at the moment when after having been rolled up into a pasty consistency in this papercase it was upon the point of setting, the matrix of the page attached to the stamping press descended upon the alloy, forming a page in relief, the clearness of which was perfect, as may be seen from the collection known by the name of the stereotype edition, composed of more than 200 volumes. At the same time that Firmin Didot succeeded by this process, M. Herhan, who at first had been his partner, resorted to another method, which consisted in striking in copper a great number of matrices, arranged in such a manner as to admit of the pages being set up with these matrices as if they had been types, with this exception, however, that instead of being in relief, like the letters, the matrices were sunk. The page when composed was attached to the hammer of a stamping press and allowed to fall upon an alloy still in a state of fusion, and thus a whole page in relief was obtained by means of these hollow matrices. This expensive process was attended with more inconveniences than that of Firmin Didot. Both of them were superseded by the process invented by Lord Stanhope in 1800, who, resuming the first attempts at stereotyping, moulded in plaster or in alabaster, the pages composed with ordinary types, and obtained casts in relief by drying the moulds in a proper manner, and plunging them into a vessel filled with metal in a state of fusion.

Numerous attempts have since been made to substitute for plaster moulds the employment of sheets of paper with whiting placed between them, but the results appear inferior to the plaster moulds.

For vignettes, casts of bitumen answer very well, and stereotype plates of bitumen give good results.

Among the products which particularly deserve to be mentioned, are those of the RUBELAND DUCAL FOUNDRY INSPECTION, whose specimen of stereotype in cast iron, with the Bible printed from it, shows a new application of that metal; of Messrs KNIGHT and HAWKES, who exhibit good specimens of stereotypes from engravings in wood, steel, &c., and plates for printing in various colours; and also of Messrs. MANCHIN and MOREL, of London, for their successful application of bitumen to the purpose of stereotype. This process, although new in England, seems to have been used in other countries for some time, and in the "Illustration," by Mr. PLOX, who has an improved mode of mounting the plates. Mr. BARKER's specimens of casts from wood matrices are produced by a most ingenious process, of foreign invention. They are used extensively by calico-printers in Manchester and other places. The mode of obtaining these casts is as follows: a pattern of the size required is put on wood in the manner well known to pin and coppered pattern

makers, care being taken that, in driving the pieces of copper in the wood block, they are forced to equal depth. Tin in a melted state is then poured on this pin or coppered pattern to the thickness of half an inch, and when cold the pattern block is placed on the bed of a screw-press, constructed for the purpose, and held fast by means of screws, whilst the part on which the tin has been poured, is affixed by clamps to the screw of the press, and by it drawn out from the pattern-block, the tin holding in a solid mass the copper forming the pattern, and leaving the wood as a matrix, from which a number of plates can be obtained by casting with fusible metal. The casts exhibited by Mr. BARKER are very beautiful and perfect, and of greater depth than can be obtained by any other known process. Mr. MUIR, of Glasgow, had an electrotpe from a page of diamond type, which appeared good. M. CURMER, of Paris, had some specimens of stereotype from paper moulds, which seems to be the same system as that patented by Mr. Kronheim some years ago, and which did not prove practicable. Mr. STARR, of Philadelphia, also exhibited stereotypes and electrotypes of some merit.

Printing Ink.

The ink of the earliest printed works of the fifteenth century presents to our view every desirable quality. It is black, glossy, and the lapse of four centuries has demonstrated the fact that it has retained its primitive qualities up to the present day. It is not the same with later impressions, in the greater part of which the ink is more or less decomposed; nevertheless that which the Aldi, the Stephani, the Elzevirs, the Ibarra, the Bodonis, the Plantins, and all other printers who were zealous for typographical renown, manufactured themselves, has retained all its primitive quality. At present the manufacture of ink is in many respects good, and the grinding, which cannot be too complete, has become more perfect by the application of improved machinery; but the ink is too often deteriorated by adulteration.

It is especially to Mr. De La Rue that this manufacture owes some real improvements, as may be judged from his specimens of printing in different colours, both upon card and upon paper. The brightness of his colours is as remarkable as their variety, and his inks are capable of being glazed almost immediately after printing. The brightness of the printing in gold, executed by his process at his manufactory is very superior to others. At the same time it is doubtful whether the brightness of vermilion ink is equal to the intensity of the red used in the printing of the fifteenth and sixteenth centuries.

As to the printing inks sent to the Exhibition, time is the only test capable of deciding their respective qualities, and as, moreover, an ink suitable to one climate may not suit another, and lastly, as the ink must be differently modified according to the state of the atmosphere, always so variable, the Jury, on weighing these considerations, have deemed it their duty to refrain from giving any opinion upon this class of products, fearing that their judgments might be set aside by time, which alone is able to disclose the truth.

Composition Printing Rollers.

Lord Stanhope entertained the idea that the forms at press could be inked by some better means than by the usual printers' balls. He had recourse to

revolving cylinders for that purpose, and tried them covered with skins dressed expressly in a variety of ways, but without success. Eventually, Mr. Foster,* an ingenious compositor, adopted the composition of the dabbers used in the potteries and made printers' balls with it. He laid it upon canvas, and when thus prepared, he produced what was so much required; the composition balls held the ink better, distributed it evenly, and imparted it equally over the form; they were easily kept clean, soft, and pliable, and thus the *first* improvement in inking by hand was accomplished. In 1811 while engaged upon the invention of the Polygonal printing-machine, Mr. Bryan Donkin's attention was directed to the improvement of printing rollers, which, as before stated, had been imperfectly made of soft skins; and the idea struck him of casting cylinders of a composition of treacle and glue, similar to that used by Mr. Foster in his printers' balls. He accordingly had some cast in tin moulds, and applied them to Donkin and Bacon's printing-machine. These rollers were soon introduced into general use, but it was found that the composition became too hard and dry to retain its elasticity, and by the advice of Mr. Tyrrel, the celebrated mechanical engraver, a certain quantity of carbonate of soda was introduced into the composition, whereby the elasticity was rendered more durable. Both Mr. Koenig and Mr. Cowper used these rollers in their printing-machines, with Mr. Donkin's permission, some time after their invention.

At the commencement of 1819, M. Gannal, of Paris, who had been for a long time occupied in the manufacture of mouth glue, which consists of a mixture of sugar and glue, and Mr. A. Chegaray, overseer in Mr. Smith's printing establishment in Paris, made printers' rollers of this composition. They are stated to be more durable than those made of treacle and glue.

In 1813, when Messrs. Applegath and Cowper's printing-machines came in more general use, the patent inking-tables and composition rollers were introduced to the hand-printers; but the prejudices of the pressmen against their use were carried to such an extreme, that it appeared almost impossible to succeed in introducing them. Mr. Harrild, however, whose knowledge of the printing business rendered him equal to the task, persevered in conciliating the pressmen, and demonstrating to them how greatly the adoption of this beneficial invention would be for their advantage, till after displaying the most untiring energy, his efforts were at last crowned with success; and he had thus the satisfaction of not only benefiting the men themselves, but of also rendering an essential service to the printing business. He was rewarded by the large demand created for rollers, every pressman becoming as eager to put aside the use of balls as he had been to oppose that of composition rollers. The manufactory which he subsequently established, and the perfection of his inking rollers, prove his sound knowledge of what was required. Messrs. Harrild's manufactory is now on an immense scale, and supplies the greater part of the printers in England with inking-rollers, which possess every requisite quality. Mr. Cowper, who is the inventor of inking-tables and hand-

* It is stated, on the authority of Mr. Harrild, that the composition was discovered by a Mr. Edward Dyas, printer and parish clerk, of Madely, near Wellington, Shropshire, from the simple circumstance of a gine-pot being upset, and not having a pelt ball ready, Dyas took a piece of glue in a soft state and inked a form with it. It is further stated that he added treacle afterwards to keep it soft. Mr. Harrild himself introduced composition balls in 1810.

rollers, has never benefited by this valuable acquisition to the printing business, a fact which cannot but be regretted. Messrs. HARRILD exhibited in the Machinery Department, Class VI., inking composition rollers and balls, and were the only exhibitors of this kind of rollers.

M. LENDENMANN, of Grub, Canton of Appenzell, Switzerland, was the only other exhibitor of printers' rollers, which he called "Swiss imitation caoutchouc." The Jury had no means of practically ascertaining the merit of these rollers, but it must be stated that the fissures on their surface left anything but a favourable impression.

Printing for the Blind.

The Jury have noticed with pleasure the large number of exhibitors, from England, France, the Zollverein, and the United States, of inventions and devices for the instruction of the blind. It has been estimated that in the European countries one person out of every 1,200 or 1,400 of the entire population is blind, and in America one in every 2,000. The great and increasing attention that is paid to the intellectual and moral instruction of this unfortunate class is one of the distinctive features of the progress of our age. A few years ago printing for the blind was considered only a curious or doubtful experiment, but it is now established beyond all question that books are true sources of profit and pleasure to them. Whilst embossed books have recently very rapidly increased, it is delightful to notice that the blind readers have multiplied far more rapidly. These circumstances have induced the Jury to attempt a brief historical sketch of the origin and progress of printing for the blind, together with the present state of the art.

The invention of printing for the blind marks a new era in the history of literature. The whole credit of this invention, so simple yet so marvellous in its results, belongs to France. It was M. Valentine Haüy who, in 1784, at Paris, produced the first book, printed with letters in relief, and soon after proved to the world that children might easily be taught to read with their fingers. It has been said by his biographer that he took his idea of embossed typography from seeing that Made-moiselle Parodis, a blind pianist of Vienna, who visited Paris that year, distinguished the keys of her instrument by the sense of touch, and also readily comprehended the maps in relief which a short time before had been invented by M. Weisenbourg of Mannheim. After employing letters of different forms and sizes, and experimenting with the blind as to the precise shape of the letter that could be the most readily distinguished by the touch, he at length fixed upon a character differing very slightly from the ordinary Roman letter, or perhaps a little approaching *italics*. There was the usual mixture of the upper and lower case, the capitals taking more of the *script* form than the small letters. He submitted his first efforts and experiments to the Academy of Sciences of Paris. A committee was appointed to examine them, consisting of the Duc de la Rochefoucauld, M. Desmarest, M. Demours, and M. Vicq-d'Azir, and their favourable Report on the 18th of February 1785, rendered his success a triumph. Great *éclat* attended the public announcement of this invention. A new Institution was established, called the *Institution Royale des Jeunes Aveugles*, and M. Haüy was placed at the head of it. Among the books which he embossed were a grammar, a catechism, and small portions of the Church service, and also several pieces of music. The printing of the music was inferior

The mechanical execution of these volumes was exceedingly heavy. Most of them were ponderous folios and very expensive, still they formed for many years almost the only literature of the blind, not alone in France, but in other countries. We should not omit particularly to mention the following book which has come under our notice:—*Notice Historique sur l'Instruction des Jeunes Aveugles. Par M. Guillié, Directeur Général de l'Institution Royale des Jeunes Aveugles de Paris. Paris, Imprimé par les Jeunes Aveugles, 1819, 4to, 52 pages, with 17 lines to a page.* Two leaves are pasted together, so that it is read as if embossed on both sides of a sheet. This is the second edition, the first having been embossed in 1817, the third in 1820, and a fourth edition enlarged in 1821. On page 52 is a curious specimen of printing in relief, in colour, so as to render the letters more easily read by the eye. This book was a valuable contribution to the library of the blind, but still retains nearly all the objections that were made to Haüy's first books; it can only be read by those possessing a very delicate touch. It is replete with information respecting the means then employed for the instruction of the blind in Paris; it proves, however, that the art of embossed typography had made but very little progress. It is singular that in this book no mention is made of the author's predecessor, Haüy, to whom, we should not forget, the idea of finger-reading is due.

Between the years 1821 and 1840 very little printing was done by this Institution, except religious books, and music after the system of notation by letters and ciphers. The following is a list of them:—

TITLE	Number of Vols.	Size.	Date of Publication	Number of Pages.	Number of Signs or Letters on a Page.	Price, ——— Francs.
Épîtres et Évangiles des Dimanches et Fêtes - - -	2	folio.	1823-8	-	-	-
Prêtres du Matin et du Soir - - - - -	1	4to.	1825	-	-	-
Annuaire de l'Organiste, par G. Gauthier - - -	2	folio.	1828	-	-	-
Office Noté des Jeudi, Vendredi, et Samedi Saints	1	4to.	1829	-	-	-
Procédés pour Écrire au Moyen des Points, par L. Braille - - - - -	1	4to.	1829 & 1837	-	-	-
Musique de mélanger les Jeux de l'Orgue, par Marinus Gruet - - - - -	1	4to.	1830	-	-	-
Traité de la Fugue, par Férís - - - - -	1	4to.	1830	-	-	-
Office Noté - - - - -	1	4to.	1830	-	-	-
Eléments d'Arithmétique extraits de Reynaud - -	3	folio.	1830 et suiv.	-	-	-
Nouvelle Méthode pour représenter la Musique au moyen de Lettres de Chiffres, etc., par M. Moallin	1	4to.	1831	-	-	-
Traité d'Harmonie, par Catel - - - - -	1	folio.	1833	-	-	-
Figures de la Géométrie et de la Trigonométrie de Legendre - - - - -	1	4to.	1833	-	-	-
Figures de la Statistique de Poisson - - - - -	1	4to.	1833	-	-	-
Choix d'Anecdotes (Système d'Écriture en Points)	1	4to.	1834	-	-	-
Grammaire Française de Noël et Chapal - - -	1	folio.	1834	-	-	-
Méthode de Lecture - - - - -	1	folio.	1836	-	-	-
Doctrina Chrétienne de Lhomond - - - - -	5	folio.	1837 et suiv.	-	-	-
Histoire-Sainte - - - - -	1	folio.	1838	-	-	-
Principes Élémentaires d'Harmonie à deux parties, par Gauthier - - - - -	1	4to.	1838	-	-	-
Petite Méthode d'Arithmétique, par L. Braille -	1	4to.	1838	-	-	-
Recueil de Cantiques pour Trois Voix, par Gauthier	3	4to.	1838	-	-	-
Cours pour apprendre à accorder les Pianos, par Moallin - - - - -	1	folio.	1839	-	-	-
Principes de Musique, par Collat - - - - -	1	folio.	1839	-	-	-
Principes d'Harmonie à plus de deux parties, par G. Gauthier - - - - -	1	folio.	1839	-	-	-
Études pour Piano, par Cramer - - - - -	1	4to.	1839	-	-	-
Examen de Conscience - - - - -	1	4to.	1840	-	-	-

L'Institut des Jeunes Aveugles de Paris, since its foundation in 1784, has at times been in a deplorable condition, but about the year 1840 it underwent a thorough reorganization, and is now, under the able management of M. Dufau, justly entitled to the front rank of institutions of this class in Europe, from its usefulness no less than its age. A radical reform in the printing department has been made: M. Dufau has devised a system of types consisting of capitals and lower-case Roman letters, and has greatly improved the character of the embossing. The French books are now well embossed, sharp, clear, and durable. They have also been so much reduced in bulk that they are offered at a moderate price. M. Dufau has proposed to print a *standard library* for the blind, to consist of 10 vols., in quarto, for elementary instruction, and 10 vols. for higher instruction. The first series is nearly completed, and this is the list:—

TITLE.	Number of Vols.	Size.	Date of Publication.	Number of Pages.	Number of Square Centimeters in a Page.	Price, Half Bound, Cloth Backs.
1. Grammaire Française, par MM. Noël et Chapsal, simplifiée à notre usage	1	4to.	1846	144	476	5
2. Complément du Cours de Grammaire	1	4to.	Not out.	-	476	5
3. Traité d'Arithmétique Élémentaire, par M. Dufour	1	4to.	1845	146	476	5
4. Géographie Élémentaire, par M. Poulain de Bossay	1	4to.	-	114	476	5
5. Histoire Sainte*	1	4to.	Not out.	-	476	5
6. Histoire Ancienne*	1	4to.	1847	159	476	5
7. Histoire Romaine*	1	4to.	Not out.	-	476	5
8. Histoire de France*	1	4to.	1845	146	476	5
9. Histoire Naturelle, extraite de divers Auteurs	1	4to.	1847	108	476	5
10. Géométrie Élémentaire	1	4to.	Not out.	-	476	5

* These four histories were composed by M. Guadet upon a new plan, and are peculiarly adapted to the use of beginners.

The second series of this library, not yet printed, it is to be hoped will soon follow. For the above lists and other interesting information respecting the Paris typography for the blind the Jury is much indebted to a valuable pamphlet published by M. J. Guadet, entitled *L'Institut des Jeunes Aveugles de Paris, son Histoire et ses Procédés d'Enseignement*, Paris 1850, 8vo, pp. 115.

At Vienna an institution for the blind was established in 1804, but the Jury is not aware of any printing having been executed for them in Austria before the year 1830 or 1831. About this date the intelligent publishers Treusinsky, of Vienna, embossed sheets with the Lord's Prayer in various languages, in Roman letters, and afterwards printed works for elementary instruction. The subject has been recently taken up by the Imperial Printing-office, and several volumes have been published, but the Jury are unable to give a bibliographical description of them.

In 1806, M. Haüy was invited to establish institutions for the blind at Berlin and St. Petersburg. His system of instruction was adopted in each of these institutions, and the books used were for a considerable time supplied from the press of Paris. Both of these institutions in a pecuniary point of view were unsuccessful to M. Haüy, and in 1808 he returned to Paris, and for a while resided in quiet with his brother the celebrated Abbé Haüy.

The Jury have not been able to trace the progress of the printing for the blind

at Berlin or St. Petersburg, but they learn that the amount of matter embossed in Germany until very recently did not exceed half of the New Testament.

It was in Great Britain and in the United States that the first improvements were made in embossed typography; and only within the last 15 years that the blind generally have derived any considerable advantages from books. Before 1826, when Mr. James Gall, of Edinburgh, first began to turn his attention to the intellectual and moral education of the blind, it is believed that not a single blind person in any public institution of this country or America could read by means of embossed characters. To Mr. Gall is due the credit of reviving this art. With the most commendable zeal, patience, and perseverance, he canvassed the form of every letter until at length he adopted his angular alphabet. He seems, from his own *Historical Sketch of the Origin and Progress of the Literature of the Blind, Edinburgh, 1834, 8vo, pp. 388*, to have experimented long and patiently with a great variety of arbitrary and Roman alphabets, with a view of finding one sufficiently simple and tangible for finger-reading. On the 28th of September 1827, he published "a First Book for Teaching the Art of Reading to the Blind; with a short statement of the principles of the art of printing as here applied to the sense of touch. Edinburgh, published by James Gall." This is believed to be the first book printed for the blind in the English language. It is a small oblong octavo volume, of nine pages, price sixpence, with four preliminary leaves in which the author sets forth his "principles." The embossing is in high relief, and though it presents rather a rude appearance from the fact of its having been printed from wooden types, yet it soon rendered the practicability of reading by the blind a matter of experience in Great Britain. Mr. Gall then issued sheets printed by metallic type, which were easily read by the pupils in the asylum at Edinburgh. Encouraged by his success, in March 1828 he issued his prospectus for the publication, by subscription, of the *Gospel by St. John*, but it was not until about the middle of 1829 that he perfected his alphabet to his own satisfaction. He tried three different founts of type:—first, the *double english* size; second, the *double pica*; and third, the *great primer*; and, after printing and cancelling sheets in each of these three founts, he at length, in January 1832, finished the printing of his great work. The blind must ever feel indebted to Mr. Gall for the zeal and honest endeavour which he displayed in accomplishing what he thought would most benefit this unfortunate class. Notwithstanding the last sheet of his work was printed in January 1832, yet it was not till October 1834 that he was enabled to publish it. It is entitled, "The Gospel by St. John, for the Blind: with an Introduction, containing some Historical Notices regarding the origin of a tangible Literature for their Use. By James Gall. Edinburgh: James Gall, 24 Niddry Street. 1834. In 4to." The introduction, in common type, comprises 18 pages. The text, in embossed characters, consists of 141 pages, with 27 lines on a page of 70 square inches. The leaves are not pasted together. The subscription price of the volume was one guinea, but it was subsequently sold for 6s. Gall was very sanguine of the entire success of his noble enterprise, and, probably, had he chosen a less angular character, and one a little more resembling our common alphabet, as he has since done, he would soon have seen his books used in every institution in the country. His alphabet was the chief objection raised to his system. His printing was clear, sharp, and permanent, and his books in every respect were a great improvement

on Haüy's and Guillié's. He published five or six other little elementary books in 1834, at the time he issued his chief work; but his system seems not to have come into extensive use. It is to Mr. Gall, perhaps, more than to any other man that the interest in the education of the blind was awakened throughout Great Britain and America. Nor has he allowed his exertions to flag. In 1837 he published "The Epistle of Paul the Apostle to the Ephesians, printed for the Blind, on the largest type." The shape of the characters is similar to that upon which the Gospel of St. John was printed, but instead of being smooth the letters are fretted or serrated. It is a small octavo volume of 72 pages, 17 lines to a page; 250 copies were printed at the price of 1s. 6d. It is printed in the lower-case letters without capitals. The Epistle to the Philippians was also printed, in octavo, price 1s. 6d. The following year he again modified and improved his alphabet by bringing it back to a still greater resemblance to the common alphabet, but unfortunately he yielded to the suggestion of the Society of Arts of Edinburgh by introducing the use of capital letters at the beginning of sentences and proper names. His next book was "The Gospel according to St. Luke, printed on the common alphabet, for the use of the Blind, and capable of being read by any blind person, 1838. Printed for the British and Foreign Bible Society, London. Printed by James Gall, 22 Niddry Street, Edinburgh." This is a well-printed volume of 158 pages, 28 lines on a page of 70 square inches; price 5s. The same year the Acts of the Apostles were printed in the same serrated letter in 150 pages, price 5s. Besides these books Mr. Gall printed a series of tracts for the blind for the London Tract Society, in 1837, price 6d. each. It is a matter of surprise that these excellent and well-printed books of Mr. Gall are not more generally used. With the exception of the school at Abbey Hill, near Edinburgh, it is believed they are adopted by no public institution in Great Britain. It is still a question if the roughness of the serrated character possesses any advantage over the smooth, sharp embossing. Old and used books are frequently preferred by the blind to new and fresh ones.

While Mr. Gall was thus engaged at Edinburgh, the Rev. Mr. Taylor, of York, displayed an intelligent and active interest in the education of the blind. In 1828 he published the *Diagrams of Euclid's Elements of Geometry in embossed or tangible form*, in octavo. This was done on Bristol board, but was found too expensive. His mode of embossing, we believe, was forcing the paper, by means of heavy pressure, into the deep cut lines of a copper plate. It was not successful. He published also a map of England and Wales. In 1836 he printed in raised characters "Selections of Psalm Tunes and Chants" in oblong 4to. Also a short history of Elijah the Prophet, and of Naaman the Syrian; and the History of Joseph.

The efforts of Mr. Alexander Hay, in the cause of embossed typography, deserve mention, although an entire failure. He devised an alphabet of 26 arbitrary characters, which by certain combinations could represent the abbreviations and double letters; so that in all, he had 58 characters. He procured types and other printing apparatus, and in 1828 or 1829, issued a prospectus for publishing the Gospel of St. Matthew, at 7s. 6d. The book was never published.

The public interest in the blind became so great, that in 1832 the Society of Arts of Edinburgh offered a gold medal of the value of 20l. "for the best communication on a method of printing for the blind," and the result was that between

the 9th of January 1832, and the 25th of February 1835, no less than 19 different alphabets were submitted, of which 16 were in a purely arbitrary character. The grand problem was to produce an alphabet that would unite cheapness and legibility.

While the puzzling question of an alphabet best adapted both to the fingers of the blind and the eyes of their friends, was under warm discussion on this side the Atlantic, Dr. Howe was developing his system at Boston, in the United States. In 1833, the Perkins Institution for the Blind was established at Boston, and Dr. S. G. Howe, a gentleman distinguished through a long series of years for his philanthropic labours was placed at its head. As Gall had done, Dr. Howe took Haüy's invention as the basis of his system, and soon made those improvements and modifications which have rendered the Boston press so famous. He adopted the common Roman letter of the lower case. His first aim was to compress the letter into a comparatively compact and cheap form. This he accomplished by cutting off all the flourishes and points about the letters, and reducing them to the minimum size and elevation which could be distinguished by the generality of the blind. He so managed the letters that they occupied but a little more than one space and a half instead of three. A few of the circular letters were modified into angular shapes, yet preserving the original forms sufficiently to be easily read by all. So great was this reduction, that the entire New Testament, which, according to Haüy's type would have filled nine volumes and cost 20*l.*, could be printed in two volumes for 16*s.* Early in the summer of 1834 he published the Acts of the Apostles. Indeed, such rapid progress did he make in his enterprise, that by the end of 1835 he printed in relief, the whole of the New Testament for the first time in any language, in four handsome small quarto volumes, comprising 624 pages, for four dollars. These were published all together in 1836. The alphabet thus contrived by Dr. Howe in 1833, it appears, has never since been changed. It was immediately adopted, and subsequently became extensively and almost exclusively used by the seven principal public institutions throughout the country. It is now the only system taught or tolerated in the United States, and deserves only to be better known in Great Britain and elsewhere to be appreciated. In America, seventeen of the States have made provision for the education of their blind, and as universal education is the policy of the country as well as its proudest boast, these books for the blind soon became in great demand. Dr. Howe some time since proposed a library for the blind, and with a view of increasing the number of books as rapidly as possible, arrangements have been made between the several institutions and presses to exchange books with each other, and not to print any work already belonging to the library of the blind. This harmony of action, together with the uniformity of the typography, presents so many obvious advantages, that the Jury cannot but wish a similar system were pursued by the Institutions of Great Britain and the continent of Europe. We subjoin a list of the books printed at the press of the Perkins Institution in Boston.—(Table, see page 917).

From this list it appears that, exclusive of the three volumes not fully described, 7,903 pages, containing on an average 77 square inches, have been printed at this press, or more than 12 times the quantity of matter contained in the New Testament. Almost all the books are stereotyped, and small editions are struck off as they are required. They are sold at the actual cost, the cost of the

TITLES.	Number of Vols.	Size.	Date of Publication.	Number of Pages.	Number of Square Inches in a Page.	Prices.		
						Dols.	£.	s. d.
The Bible, containing the Old Testament -	6	4to.	1842	1849	117	16.00	3	6 1
The New Testament (small) - - - -	4	"	1836	624	84	4.00	0	16 6
The New Testament (large) - - - -	2	"	1842	430	117	4.00	0	16 6
(The several books sold separately at corresponding prices).								
The Acts of the Apostles - - - -	1	"	1834	-	84	-	-	-
Lardner's Universal History - - - -	3	"	1837	437	88	9.00	1	17 2
Howe's Geography - - - -	1	"	1836	174	88	3.00	0	12 6
Howe's General Atlas - - - -	1	folio.	-	-	-	3.00	0	12 6
Howe's Atlas of the United States - -	1	"	-	-	-	2.00	0	8 4
Howe's Atlas of the Islands - - - -	1	4to.	1838	44	80	2.50	0	10 4
English Reader, First Part - - - -	1	"	1838	146	75	3.00	0	12 6
English Reader, Second Part - - - -	1	"	1839	139	75	3.00	0	12 6
Dairymen's Daughter - - - -	1	"	1835	162	50	1.00	0	4 2
The Harvey Boys - - - -	1	"	1837	77	85	1.00	0	4 2
The Spelling-book - - - -	1	"	1835	80	51	1.00	0	4 2
Bunyan's Pilgrim's Progress - - - -	1	"	1836	184	84	2.50	0	10 4
Baxter's Call - - - -	1	"	1836	139	76	1.50	0	6 3
Murray's English Grammar - - - -	1	"	1835	112	51	1.00	0	4 2
Howe's Blind Child's First Book - -	1	"	-	32	39	1.00	0	4 2
Howe's Blind Child's Second Book -	1	"	1846	45	30	.75	0	3 1
Sixpenny Glass of Wine - - - -	1	"	-	25	41	.50	0	2 1
Life of Melancthon - - - -	1	"	1837	50	52	1.00	0	4 2
Book of Sacred Hymns - - - -	1	"	-	-	-	1.00	0	4 2
Howe's Blind Child's Manual - - -	1	"	1840	65	35	.75	0	3 1
Constitution of the United States -	1	"	-	25	75	.75	0	3 1
Book of Diagrams - - - -	1	"	1836	58	48	.75	0	3 1
Viri Romæ - - - -	1	"	1839	52	75	2.00	0	8 4
Peirce's Geometry with Diagrams -	1	"	1840	85	75	2.00	0	6 4
Political Class Book - - - -	1	"	1841	112	75	2.00	0	8 4
First Tables of Logarithms - - - -	1	"	1841	75	88	1.00	0	4 2
Second Tables of Logarithms - - -	1	"	1841	133	80	2.00	0	8 4
Principles of Arithmetic - - - -	1	"	1840	49	75	1.00	0	4 2
Astronomical Dictionary - - - -	1	"	1841	49	63	1.50	0	6 3
Smellie's Philosophy of Natural History -	1	"	1845	189	75	3.00	0	12 6
Olmsted's Rudiments of Natural Philosophy -	1	"	1845	122	80	3.00	0	12 6
Cyclopædia - - - -	6	"	1845-9	1388	114	18.00	3	14 4
The Book of Common Prayer - - -	1	"	1845	240	114	1.00	0	4 2
Guide to Devotion - - - -	1	"	1846	141	114	1.00	0	4 2
Book of Psalms - - - -	1	"	1837	146	88	1.00	0	4 2
Book of Proverbs - - - -	1	"	1842	38	117	.50	0	2 1
Psalms in Verse - - - -	1	"	1835	97	73	1.00	0	4 2
Psalms and Hymns - - - -	1	"	1848	169	120	2.00	0	8 4

larger works being averaged on an edition of 250 copies. The above prices include the binding; 50 per cent. discount is made for books sold in sheets. The books are embossed in the Institution under the superintendence of Dr. Howe himself, by means of a powerful press, built for the purpose. The sale of books in 1851 amounted to \$427 dollars. This, however, is exclusive of the Scriptures. The American Bible Society, which now uses the stereotype plates of the Bible described above, distributed last year 149 volumes of the Bible. In short, the Boston books possess a neatness, clearness, sharpness, and durability of impression peculiar to themselves. The seventh volume of the Cyclopædia is already printed, and the Jury learn with pleasure that the printing of the remaining volumes will be resumed and probably be finished in 20 volumes very soon. Want of funds is the temporary and only obstacle.

About the time that the Perkins Institution was established at Boston, another was set up in Philadelphia. A meeting of benevolent persons was called on the

21st of January 1833, when arrangements were made to open a school for the instruction of the blind, and Mr. J. R. Friedlander was placed at its head. This school became the Philadelphia Institution for the Blind by Act of Incorporation, 27th of January 1834. The blind owe much to Mr. Friedlander for the Philadelphia contributions to their literature. On the 21st of November 1833, he held his first public examination, and astonished the public by the progress of his pupils in reading, writing, geography, music, &c. The pupils read fluently from tangible letters executed by themselves with *pin-types*. These were small pieces of wood about two inches long, having a letter cut in relief on one end, and the same letter formed at the other by steel points. Maps of the world and of the United States were also exhibited, made by perforating the outline from behind. The result of this exhibition was highly satisfactory. In his address, Mr. Friedlander set forth the great advantages that would accrue to the blind by a general system of instruction. He repeated the usual unanswerable arguments against the adoption of *arbitrary* characters, and stenographic or phonetic systems, and strongly recommended the use of our own alphabet. He followed generally Haüy's plan of instruction. Early in 1833, Jacob Snider, a young gentleman, native of Philadelphia, applied his mind to the contrivance of a method of printing in relief. The alphabet at first adopted was a mixture of the upper and lower case italics, and the relief was produced by heavy pressure on thick paper between two sheets of copper having the letters deeply cut. The embossing was thus on both sides. His first attempt, after printing a few elementary sheets, was on the Gospel of St. Mark, which he completed by the end of 1833, in a large quarto volume, and published early in January 1834. An account of his first American book for the blind may be found in Poulson's American Daily Advertiser of the 10th of January 1834. The four Gospels were soon after printed in Roman capitals; but being found too bulky and otherwise objectionable they were abandoned, and a smaller, more compact, and sharper type, in the Roman capitals, was adopted. The books printed at the Philadelphia press are—

TITLE.	Size.	Number of Vols.	Date of Publication.	Number of Pages.	Number of Square Inches in a Page.
St. Matthew's Gospel - - - - -	4to.	1	1834	-	60
St. Mark's Gospel - - - - -	??	1	1833	160	60
St. Luke's Gospel - - - - -	??	1	1835	-	60
St. John's Gospel - - - - -	??	1	1835	-	60
Select Library - - - - -	folio	5	1839	500	-
Ruth and Esther - - - - -	??	1	1838	50	-
Student's Magazine (published monthly) - - -	??	6	1838-43	-	140
Proverbs - - - - -	??	1	1839	96	-
Spelling Book - - - - -	??	1	-	86	-
Church Music - - - - -	??	3	1840	300	-
Psalms and Hymns - - - - -	??	1	1840	68	-
Early Days of Washington, and Declaration of Independence - - - - -	-	1	1834	71	-
De Oester Eier (in German) - - - - -	??	1	-	84	-
Answahl (in German) - - - - -	??	1	-	44	-
French Verbs - - - - -	??	1	1839	25	-
Dictionary of Musical Terms - - - - -	??	1	-	-	-

It appears that the Boston and Philadelphia Institutions were founded almost

simultaneously, and that their presses and system of typography were established without being apprised of the efforts of each other. Time, however, has at length remedied this diversity. The typography of the Philadelphia books is exceedingly well executed, and compares most favourably with the best of the Glasgow books, but the press has ceased to work, and printing in capital letters will not probably be resumed. From the preference which the present distinguished and intelligent Director of the Philadelphia Institution, Mr. William Chapin, late Superintendent of the Ohio Institution, is known to entertain for the Boston system of typography, we may reasonably hope that when printing shall be resumed there, it will be with Howe's alphabet. It is the opinion, however, of Mr. Chapin that all the American Institutions should unite, not only in the use of the same alphabet, but that they should all contribute to support one press. It may be remarked here that the pupils in all the American Institutions read fluently in both the upper and lower case letters, but it is presumed that Philadelphia and Glasgow books will soon be entirely abandoned there; and as the Boston books can now be obtained in London at a price cheaper than any of the five different systems of books printed in Great Britain, it is to be hoped that they will come into general use here. If it be thought that the letters are too small for adults to read with ease, books may be printed with larger types, and even then be less bulky and expensive than any of the systems in arbitrary characters now in use.

In the year 1848 or 1849 the Virginia Institution set up a press, and has printed several elementary and school books. The Boston type is adopted, with the exception that capitals are used at the beginning of sentences and proper names. This alteration, in the opinion of the Jury, is not an improvement, as the blind are thus compelled to learn two alphabets instead of one. The Virginia books are well embossed, and it is hoped that in future books capitals will be omitted.

To the American Bible Society at New York much praise is due for their commendable efforts in the circulation of the Scriptures among the blind. The stereotype plates of the Bible in six volumes, executed at the Boston press, under the superintendence of Dr. Howe, now belong to this society. They have printed a second edition from the same plates, and annually distribute gratuitously from 100 to 300 volumes.

It had ceased to be a matter of surprise in the United States that the blind could read, before the public attention was loudly called to the subject in Great Britain, for we see that in 1836, there were two active printing establishments for the blind in the United States; by one the whole of the New Testament had been published in cheap form, in the common lower-case letters, and by the other the four Gospels in Roman capitals. Let us now return to the Society of Arts of Edinburgh, and their Prize Medal, to which we have already referred. It was not until the 31st of May 1837, that the Society's Medal was awarded. In 1836, when the 19 different alphabets were before the Committee of the Society, circulars were drawn up and distributed, with specimens of the several alphabets, to the various institutions for the blind in England and Scotland, and every means employed to arrive at a correct result. The opinions of Mr. Taylor, of York, and Mr. Alston, of Glasgow, seem to have been those which the Society chiefly followed. They were in favour of the common Roman capital letter, merely deprived of the serifs, or small strokes at their extremities; and accordingly the prize was awarded to Dr. Fry, of

London; and on the 31st of May 1837, a medal was granted to him for the invention of an alphabet which appears to have been in use since 1833 in Philadelphia.

On receiving the Society's circular in 1836, submitting the forms of all the competing alphabets to him, Mr. Alston was struck with the simplicity of Fry's, and immediately conceived the idea of making such alterations as he thought necessary, and putting it to the test. The changes made were simply to reduce the size of the letters and render the faces thinner. On the 26th of October 1836, he exhibited his first specimen of printing in relief in the Roman capital letter at a public examination of the blind. It was Fry's alphabet slightly changed to improve the sharpness of the embossing. He then made a successful appeal for a printing fund. After great exertions and most commendable perseverance he procured a printing press, with two founts of type, and the other necessary printing apparatus. In January 1837 he issued a few elementary works. By March 1838 he had made such progress that the whole of the New Testament was printed in four super-royal 4to volumes. The type is great primer, and there are in the four volumes 623 leaves of 42 lines to a page. In December 1840, Mr. Alston completed the printing of the Old Testament in 15 super-royal quarto volumes, in double pica type. Of nine of the volumes he printed 200, and of the remaining six, 250 copies. There are in all these 15 volumes, 2,535 pages, with 37 lines on a page. Mr. Alston was justly proud of his great work, the entire Bible containing the Old and New Testaments, in 19 volumes. In his "*State-ments of the Education, Employments, and Internal Arrangements adopted at the Asylum for the Blind, Glasgow, with a short Account of its Founder, &c.*," 10th Ed., 1846, 8vo., p. 80, he says, "this is the first Bible ever printed for the blind;" but in this he was evidently in error, as we have shown that the greater part of it had long before been printed in Boston. We allude to these facts merely because it seems a matter of much regret that Mr. Alston should have devoted so much enterprise and money in producing the Scriptures when he might have ascertained that they had already been printed, and could have been bought at less money than it would cost him to print them. The main difference between the Glasgow and the Boston alphabets is that one is in the upper and the other is in the lower case, which difference is certainly not of sufficient consequence to demand two editions. Had he expended the same energy and money in producing other valuable books, and exchanged them with the Boston and Philadelphia Institutions, as he was urged to do, the three Institutions would have been greatly benefited by the large outlay, and the blind of both countries would have had a great increase to their library. On the 18th of January 1838, the officers of the Philadelphia Institution wrote to Mr. Alston, informing him that they possessed a printing press, and "understanding that you adopt the same character, it appears to our Board of Management that both Institutions would gain by an interchange of volumes." Mr. Alston at once acceded to this proposition, and immediately shipped 150 volumes, being 10 full sets of the New Testament and 50 single copies of the Gospels, besides multiplication tables and other works. We subjoin a complete list of the books issued from the Glasgow press since its first establishment.

TITLES.	Number of Vols.	Size.	Date of Publication.	Number of Pages.	Number of Square Inches in a Page.	Price.
The Bible: the Old Testament complete - - -	15	4to.	1839-40	3555	90	£. s. d. 7 10 0
" the New Testament complete (or separately) - - - - -	4	"	1838	625	90	2 0 0
1. Genesis - - - - -	1	"	1840	159	90	0 10 0
2. Exodus and Leviticus - - - - -	1	"	1840	229	90	0 13 0
3. Numbers - - - - -	1	"	1840	137	90	0 9 0
4. Deuteronomy - - - - -	1	"	1840	115	90	0 7 6
5. Joshua, Judges, and Ruth - - - - -	1	"	1840	165	90	0 10 0
6. Samuel - - - - -	1	"	1840	178	90	0 11 0
7. Kings - - - - -	1	"	1840	186	90	0 11 0
8. Chronicles - - - - -	1	"	1840	190	90	0 11 0
9. Ezra, Nehemiah, and Job - - - - -	1	"	1840	159	88	0 9 0
10. Psalms - - - - -	1	"	1840	217	62	0 13 0
11. Proverbs, Ecclesiastes, Song of Solomon, and Esther - - - - -	1	"	1840	127	88	0 8 6
12. Isaiah - - - - -	1	"	1840	152	90	0 10 0
13. Jeremiah and Lamentations - - - - -	1	"	1839	188	90	0 11 0
14. Ezekiel - - - - -	1	"	1839	160	90	0 10 0
15. Daniel to the end - - - - -	1	"	1840	173	90	0 11 0
St. Matthew - - - - -	1	"	1839	79	90	0 5 6
St. Mark - - - - -	1	"	1837	50	90	0 4 0
St. Luke - - - - -	1	"	1838	84	90	0 5 6
St. John - - - - -	1	"	1838	62	90	0 4 6
Acts of the Apostles - - - - -	1	"	1843	80	90	0 5 6
Galatians, Ephesians, Philippians, and Colossians (editions in large type) - - - - -	1	"	1845	53	90	0 4 0
Epistle to the Romans - - - - -	1	"	1842	42	90	0 4 0
Church of England Catechism - - - - -	1	ob. 8vo.	n. d.	16	40	0 1 0
Church of Scotland Shorter Catechism - - - - -	1	4to.	1839	32	55	0 2 6
Selections from Eminent Authors - - - - -	1	ob. 8vo.	1839	23	38	0 1 6
Selections of Sacred Poetry, with Tunes - - - - -	1	"	n. d.	22	40	0 2 0
Map of England and Wales - - - - -	sheet.	folio.	n. d.	-	285	0 2 0
Specimens of type:—Ruth and James - - - - -	1	4to.	1837	19	80	0 2 6
First and Second Book of Lessons - - - - -	1	"	n. d.	30	42	0 1 6
A Selection of AEsop's Fables, with Woodcuts - - - - -	1	ob. 8vo.	1838	28	40	0 2 0
Psalms and Paraphrases (Scotch version) - - - - -	2	4to.	1838	342	63	0 16 0
Lessons on Religion and Prayer - - - - -	1	ob. 8vo.	1843	26	44	0 1 6
Psalms and Hymns (version of Tate and Brady) - - - - -	1	folio.	1841	207	104	0 12 0
Morning and Evening Services (Liturgy) - - - - -	1	4to.	1839	34	68	0 2 6
Epitomized History of the Bible (Second Edition) - - - - -	1	"	n. d.	37	44	0 2 0
Musical Catechism, with Tunes - - - - -	1	"	1838	38	40	0 3 6
English Grammar - - - - -	1	ob. 4to.	1838	72	67	0 5 0
Todd's Lectures - - - - -	3	ob. 8vo.	1841	185	53	0 7 6
Description of London, by Chambers - - - - -	1	"	1841	75	46	0 3 0
Meditations on the Sacrament, and Prayers - - - - -	1	4to.	1843	42	90	0 4 0
Scottish Songs - - - - -	1	ob. 8vo.	1844	25	70	0 3 0
Introduction to Astronomy - - - - -	1	"	1841	32	52	0 3 6
Alphabet, on Card - - - - -	1	"	n. d.	1	35	0 0 2
Outlines of Natural History (Quadrupeds) - - - - -	1	"	1842	15	38	0 1 0

Since the death of Mr. Alston, on the 20th of August 1846, the Glasgow press has almost ceased to work. A few of the volumes have been reprinted. It is at present engaged in reprinting the Gospel of St. John and the Acts of the Apostles. Since 1837 it has been almost the only press that has supplied England, Ireland, and Scotland with embossed books in Roman type. These books are typographically well executed, and the Jury think that Mr. Alston and the Glasgow press are deserving of great praise. The objections, however, to the small Roman capitals, in which most of the books are printed, are such that it is to be hoped that ere long this press will follow the example of that at Philadelphia, and adopt Howe's typography.

It has generally been supposed that the Glasgow press was the only one in Great Britain that printed anything of consequence in the common letter. But we cannot omit to mention a valuable work that has come under our notice; it is a "*Magazine for the Blind*. London: Simpkin, Marshall, & Co., Stationers' Court; Price 6s.; in twelve monthly parts. 1839-40." After two volumes were printed, the first Magazine for the Blind in this country was discontinued. It is in quarto form, and has 23 lines on a full page. The type is the ordinary mixture of the upper and lower case of Roman letter, and the work is beautifully printed. The first volume contains 78 pages, and the second 73. It is to be regretted that so valuable a contribution to the literature of the blind should not have found better support. It consists of miscellaneous information, with fragments of authors, poetry, anecdotes, woodcuts, &c.

In 1806 an Institution for the Blind was established at Stockholm, and it is with pleasure that we learn that Mr. Watts, of Crown Court, London, has, at the expense of the British and Foreign Bible Society, printed in relief, with the ordinary Roman type, in capitals and lower-case, the Gospel according to St. Luke, in Swedish, for this Institution. The volume was printed in 1848, and is a beautiful specimen of embossed typography. It is in quarto, consisting of 132 pages, 27 lines on a page of 70 square inches. Price, as sold by the Bible Society, at cost, 6s.; 500 copies were printed.

In France, Belgium, Prussia, Austria, Switzerland, Sweden, and the United States, the Roman lower-case alphabet is used. In most, if not all of these countries, the Institutions for the Blind are supported and partially controlled by Government, and perhaps this is the reason why in all of them nearly the same system of typography prevails.

In Great Britain, however, the case is different. There are now five entirely different systems of typography in use here, and vigorously pressed upon the benevolent public. The unfortunate blind are thus deprived of the advantages they might have if harmony of action and uniformity of typography were adopted. This diversity of opinion is causing great injustice to them, and the Jury cannot but urge upon the parties concerned the speedy adoption of some one system throughout the country. Our opinion is decidedly in favour of Howe's American typography. Perfection is not claimed for this system, but it seems to us that there are fewer objections to it than to any of the others, and it may be the more easily improved; but any one of the five principal systems now used in England is far better than so many. The present state of printing in the Roman character in Great Britain is, as we have seen already, that every press has been stopped, while the books in arbitrary characters seem to be increasing and gaining public favour. The principal of these is one known as Lucas's. It was devised by T. M. Lucas, of Bristol, about the year 1835. It consists of arbitrary characters, and is said to be founded on Byron's system of stenography. It is simple, speedily learned, and easily read by the touch, and is generally acknowledged to be of all the arbitrary systems the best. The printing in this system began at Bristol, and the following are the works published there:—

1. The Gospel according to St. John, edited by T. M. Lucas, inventor of the system for teaching the blind to read by embossed stenographic character;

July, 1837; Bristol; in 4to, 66 pages, and 27 lines to a page. Two pages are pasted together,

2. The Acts of the Apostles (according to the authorized version), in T. M. Lucas's embossed stenographic character; 1838. Published under the direction of the Bristol Society for Embossing and Circulating the Authorized Version of the Bible for the use of the Blind; Bristol; in 4to. 118 pages, 27 lines on a page.

This second publication of Mr. Lucas was announced as containing some improvements,—as widening the spaces, and lessening the abbreviations.

3. The Gospel according to St. Matthew (according to the authorized version), in T. M. Lucas's embossed stenographic character, 1839; published &c.; Bristol; 4to, 116 pages. In this third publication is announced the firm conviction that this system will prevail over any other plan, on account of its tangibility.

4. The Gospel according to St. Mark, &c.; Bristol, 1840; 4to, 71 pages.

The above, with the exception of a few small elementary works, are, we believe, all that appeared at Bristol. In the year 1839, a Society was formed, called "The London Society for Teaching the Blind to Read." They adopted Lucas's system, and have been gradually improving it. The following year the types and printing apparatus was transferred from Bristol to London; and in 1841 the Society issued 'The Epistle to the Romans.' Since then their press has not been idle, as the following list will show. The printing is now done by the blind at the Institution in the Avenue Road, Regent's Park.

TITLES.	Number of Vols.	Size.	Date of Publication	Number of Pages.	Number of Square Inches in a Page.	Price to Subscribers	Price to Non-Subscribers
THE BIBLE AS FAR AS PRINTED - - -	14	4to.	1842-50	-	70	£. s. d.	£. s. d.
The New Testament complete - - -	9	"	1839-51	-	70	4 7 6	8 14 4
(May be had separately)						1 10 6	2 0 0
Genesis, Part I. - - - - -	1	"	1843	113	70	0 4 0	0 8 4
Genesis, Part II., and Exodus, Part I. - - -	1	"	1843	112	70	0 4 0	0 8 4
Exodus, Part II. - - - - -	1	"	1843	110	70	0 4 0	0 8 4
Numbers I. - - - - -	1	"	1849	139	70	0 4 6	0 5 6
Numbers II., and Deuteronomy I. - - -	1	"	1849	117	70	0 4 0	0 8 4
Deuteronomy II., and Joshua I. - - -	1	"	1850	123	70	0 5 0	0 8 0
Psalms, Part I. - - - - -	1	"	1842	95	70	0 3 6	0 4 8
Psalms, Part II. - - - - -	1	"	-	-	70	0 4 0	0 5 4
Proverbs, Ecclesiastes, and Song of Solomon - - -	1	"	1849	111	70	0 4 8	0 8 8
Isaiah, Part I. - - - - -	1	"	1844	98	70	0 3 6	0 4 8
Isaiah, Part II., and Hosea - - - - -	1	"	1844	98	70	0 3 8	0 4 8
Jeremiah, Part I. - - - - -	1	"	1847	104	70	0 4 0	0 5 4
Jeremiah, Part II. - - - - -	1	"	1848	109	70	0 4 0	0 5 4
Joel to Malachi - - - - -	1	"	1846	119	70	0 4 0	0 5 4
Matthew, New Edition - - - - -	1	"	1846	108	70	0 4 0	0 5 4
Mark - - - - -	1	"	-	71	70	0 3 0	0 4 0
Luke, New Edition - - - - -	1	"	1851	119	70	0 4 0	0 8 4
John, New Edition - - - - -	1	"	1848	86	70	0 3 0	0 4 0
Acts, New Edition - - - - -	1	"	1845	120	70	0 4 0	0 5 4
Romans - - - - -	1	"	1841	41	70	0 2 0	0 2 8
Corinthians to Ephesians, inclusive - - -	1	"	1844	100	70	0 3 6	0 4 8
Philippians to Hebrews, inclusive - - -	1	"	1844	95	70	0 3 6	0 4 8
James to Revelation, inclusive - - -	1	"	1844	101	70	0 3 6	0 4 8

TITLES.	Number of Vols.	Size.	Date of Publication.	Number of Pages.	Number of Square Inches in a Page.	Price to Subscribers	Price to Non- Subscribers
Liturgy, Select Portions - - - -	1	4to.	1849	111	70	£. s. d.	£. s. d.
Prayer-book Psalms, Part I. - - -	1	32	1849	104	70	0 4 6	0 5 6
Prayer-book Psalms, Part II. - - -	1	32	1849	95	70	0 4 0	0 5 4
Prayers and Hymns - - - -	1	32	1842	109	70	0 4 0	0 5 4
Hymn-book, embossed by the Blind Pupils	1	8vo.	1845	72	70	0 2 0	0 2 8
Scripture Lessons - - - -	1	-	-	-	-	0 0 6	0 0 8
First-Class Book - - - -	1	-	-	-	-	0 0 6	0 0 8
Second-Class Book - - - -	1	-	-	-	-	0 0 6	0 0 8
Tin-foil Alphabet - - - -	-	-	-	-	-	0 0 6	0 0 8
Card Alphabet - - - -	-	-	-	-	-	0 0 2	0 0 3
Ciphering Board and Type - - - -	-	-	-	-	-	0 17 6	1 0 0
Raised Maps of Europe, Asia, Africa, America, North and South, each - - -	-	-	-	-	-	0 15 0	0 17 6
An Apparatus for Embossing in Lucas's System, adapted by Mr. Wood, the Master The Figures of the First Book of Euclid's Elements of Geometry, on Five Boards, by Mr. Wood, each - - - -	-	-	-	-	-	0 15 0	0 17 6
A Chess-Board, adapted to the use of the Blind, by Mr. Wood - - - -	-	-	-	-	-	0 10 6	0 12 0
The Book of the Prophet Ezekiel, and a New Edition of the Psalms (Bible ver- sion) is in course of preparation - - -	-	-	-	-	-	0 9 0	0 11 0

In May 1838, the "London and Blackheath Association for embossing the Scriptures in various languages, and for teaching the Blind to read on the Phonetic System," was established. Its object is to stereotype the Holy Scriptures in James Hartley Frere's phonetic characters. About the year 1839, Mr. Frere devised a cheap plan for embossing or stereotyping. It consists simply of small wires, drawn with angles laid down upon tin plates. The wires are bent, and cut by means of ingenious spindles to form the characters, which are similar to those of Gurney's system of short hand. The wires are attached to the plate by heating it sufficiently to melt the coating of tin, into which the wire sinks and is fast when cold. The common printing press is used in embossing. Mr. Frere's books are read from left to right, and back, after the manner of the Ancient Greek boustrophedon writing. Mr. Frere's books are well embossed, and from his plates the books can be printed as they are wanted. The objections to phonetic alphabets are obvious. Mr. Frere, however, does not claim to supersede the common spelling, or the common printing, or common embossing, but to form an easy introduction to them. The following is a complete list of Mr. Frere's books.

TITLES.	Number of Vols.	Size.	Date of Publication.	Number of Pages.	Number of Square Inches in a Page.	Price.
THE NEW TESTAMENT Complete - - -	8	ob. 4to.	1839-51	723	110	£. s. d.
THE OLD TESTAMENT as far as Printed (Each Volume sold separately.) - - -	7	32	-	811	110	2 10 0
Matthew - - - -	1	32	-	83	110	0 6 0
Mark - - - -	1	32	-	72	110	0 5 6
Luke - - - -	1	32	-	88	110	0 7 0
St. John - - - -	1	32	-	96	110	0 5 6

TITLES.	Number of Vols.	Size.	Date of Publication	Number of Pages.	Number of Square Inches in a Page.	Price.
Acts - - - - -	1	oh. 4to.	-	110	110	£. s. d. 0 7 0
Romans to Corinthians - - - - -	1	"	-	89	110	0 8 0
Galatians to Philemon - - - - -	1	"	-	74	110	0 5 6
Hebrews to Revelation - - - - -	1	"	-	111	110	0 7 0
Genesis - - - - -	1	"	-	132	110	0 8 0
Exodus - - - - -	1	"	1843	112	110	0 7 0
Joshua - - - - -	1	"	1852	65	110	0 3 8
Judges - - - - -	1	"	1852	85	110	0 3 6
Proverbs and Ecclesiastes - - - - -	1	"	-	76	110	0 5 0
Isaiah - - - - -	1	"	1843	128	110	0 7 8
Daniel, Esther, and Ruth - - - - -	1	"	-	69	110	0 5 6
Psalms (Prayer Book Version) - - - - -	2	"	-	184	110	0 12 0
Grammar - - - - -	1	"	-	13	110	0 1 0
Morning and Evening Prayer - - - - -	1	"	-	35	70	0 2 0
Hymns from Cowper and Newton - - - - -	1	"	-	40	70	0 2 0
Five addresses to those who wish to go to Heaven - - - - -	1	"	-	21	110	0 1 8

More recently still another system has been devised by Mr. W. Moon, master of the Brighton Blind Asylum. The characters are arbitrary, though Mr. Moon defines them as the "Common Alphabet Simplified." He claims also a new mode of stereotyping, by which the characters are rendered sharp and prominent. The lines are read forwards and back, like Frere's plan; and it is even more bulky and expensive than his. The new mode of stereotyping is believed to be quite the same as Frere's—by means of wires laid on tin plates. We subjoin a list of Mr. Moon's publications:—

The different sizes of the print are distinguished thus:—

1. Lines very wide apart, for beginners.
2. " wide.
3. " nearer.
4. " flatter, as well as nearer.

Size of Print.	TITLES.	Number of Vols.	Size.	Date of Publication	Number of Pages.	Number of Square Inches in a Page.	Price.
	The New Testament complete - - -	9	oh. 4to.	1848-51	-	110	£. s. d. -
	(Volumes sold separately.)						
2	Psalms - - - - -	1	"	1851	-	110	1 1 0
3	St. Matthew's Gospel - - - - -	1	"	1849	-	110	0 12 0
3	St. Mark's Gospel - - - - -	1	"	1849	-	110	0 7 0
2	St. Luke's Gospel - - - - -	1	"	-	-	110	0 13 0
2	St. John's Gospel - - - - -	1	"	1848	-	110	0 8 0
3	The Acts of the Apostles - - - - -	1	"	1849	-	110	0 13 0
2	Romans and Corinthians - - - - -	1	"	1850	-	110	0 12 0
4	Galatians to Philemon - - - - -	1	"	1849	-	110	0 7 0
3	{ Epistle to the Hebrews—James, Peter, John, and Jude - - - - - }	1	"	1850	-	110	0 10 6
2	Revelation - - - - -	1	"	1851	-	110	0 7 0
2	1st, 2nd, and 3rd Epistles of St. John - - - - -	1	ob. 6vo.	1851	-	50	4 0 0
1	{ St. John's Gospel, Chapters XIV. and XV., each - - - - - }	2	"	1850	20+18	50	{ 0 1 6 each.
1	Epistle to the Hebrews, Chapter XII. - - - - -	1	"	1851	15	50	0 1 6
1	Isaiah LIII. and Psalms XXIII. and CXXV. - - - - -	1	"	1851	-	50	0 1 6
1	{ First Lesson Book, containing Freeman's Card, and Scripture Texts - - - - - }	1	"	1850	19	50	0 1 6

Size of Print.	TITLES.	Number of Vols.	Size.	Date of Publication.	Number of Pages.	Number of Square Inches in a Page.	Price.
1	Morning and Evening Devotions - - -	1	ob. 8vo.	1847-50	-	50	£. s. d. 0 6 0
4	The Last Days of Polyarp - - -	1	"	1847	10	50	0 1 0
4	The Last Days of Crammer - - -	1	"	1847	-	50	0 1 6
1	The Cataract of Niagara - - -	1	"	1849	13	50	0 1 2
4	A Remarkable Tiger Hunt - - -	1	"	1847	-	50	0 1 6
4	The Seaman's Leap for Life - - -	1	"	1847	-	50	0 1 0
4	The Sagacity of a Lioness - - -	1	"	1847	7	50	0 1 0
4	Anecdotes of Two Dogs - - -	1	"	-	8	50	0 1 0
1	The Lord's Prayer in English - - -	sheet.	-	-	-	-	0 0 4
1	The Lord's Prayer in the Irish, French, Spanish, German, Italian, and Chinese Languages, each - - -	sheets.	-	1849	-	-	0 0 6
-	Animals, various, each - - -	sheet.	-	1851	-	-	0 0 6
-	Mathematical Diagrams from Euclid - - -	1	-	1851	-	-	1 1 0
-	Patterns for Knitting - - -	1	-	1851	-	-	0 3 0
-	Hymns arranged for four voices - - -	1	-	1851	-	-	0 10 6
-	Hymn Tunes, arranged for the Pianoforte - - -	1	-	1851	-	-	0 10 6
-	Maps—Africa, North America, South America, Ireland, Palestine, Jerusalem, and British Isles, each - - -	sheets.	-	1849	-	-	0 1 0
-	Hymn for the Blind - - -	1	ob. 8vo.	1851	6	50	0 1 0
-	English Dictionary (begun 1850) - - -	1	ob. 4to.	1850	-	-	-

If now the NEW TESTAMENT, printed in all the six systems used in the English language, be taken as a standard of comparison, the following Table will show the results:—

SYSTEMS.	Number of Vols.	Size.	Number of Pages.	Number of Lines in a Page.	Number of Square Inches in a Page.	Price.
The New Testament:—						£. s. d.
Howe's - - -	2	4to.	430	-	117	0 16 0
Alston's - - -	4	"	623	42	90	2 0 0
Gall's - - -	8	"	-	28	70	2 0 0
Lucas's - - -	9	"	841	27	70	2 0 0
Frere's - - -	8	ob. 4to.	723	-	110	2 10 0
Moon's - - -	9	"	-	25	110	4 10 0

By a comparison of all these lists it will be found that Howe's books are not only much less in bulk than any of the others, but are also much cheaper.

APPARATUS AND BOOKS FOR THE BLIND.

England.—Mr. E. A. HUGHES, of Mount Row, Westminster Road, exhibited a machine for enabling persons born blind to write, in raised characters, without using types; a machine to write with a pen or pencil in skeleton Roman capitals; a machine to cast accounts and make general arithmetical calculations by tangible characters; a machine to copy and compose music on paper, &c. Mr. WEDGWOOD, of Lombard-street, exhibited an improved noctograph, useful to persons who have become blind, *after having learnt to write.*

The SOCIETY FOR TEACHING THE BLIND TO READ, Avenue Road, Regent's Park, exhibited embossed books for the blind; ciphering-boards for the blind; maps for the blind; geometrical boards for the blind; apparatus invented by Mr. W. Wood, for enabling the blind to emboss Lucas's characters, and thus to communicate with

each other ; a specimen of music by Mr. Wood, for the blind, in raised characters ; and chess-boards for the blind. The system adopted is Lucas's, which has already been fully described, and has the objection of being in arbitrary characters : this also applies to the machine. This is a well-established institution, and great pains were taken during the whole of the Exhibition, by the master, Mr. Wood, to demonstrate the successful operation of the various plans he has adopted to educate blind persons.

MR. JAMES GALL, Myrtle Bank, Edinburgh, exhibited Gall's triangular alphabet for the blind, which, by its similarity to the Roman alphabet, is said to be easily read by eye and touch without previous instruction. A volume, containing the Epistle to the Ephesians, printed with this alphabet, and Gall's apparatus for writing by and to the blind. The apparatus consists of a stuffed frame, on which paper is placed ; of a cover with bars to guide the lines, which are written from the bottom upwards ; and of small stamps, with the letters formed of common pins, which are pricked through the paper and read on the opposite side.

THE EDINBURGH SCHOOL FOR THE BLIND, Abbey Hill, Edinburgh, exhibited Dr. Foulis' tangible ink for the blind. This ink contains a large quantity of solid matter, which is deposited on the paper, so as to present a raised surface to the finger. Dr. Foulis' manuscript music notation for the blind. Mr. Gall's typhograph for the blind. Mr. Gall's system of arithmetic for the blind, accomplished by common pins stuck into a pin-cushion, and Mr. Gall's types for correspondence, by which blind persons can correspond with one another, or jot down memoranda for private use. Dr. Foulis' tangible ink appears to present some advantages, and will probably become a useful adjunct to the numerous means devised for the instruction of the blind, and for enabling them to read and write. The letters on the specimens exhibited were sufficiently raised to be quite perceptible to the touch.

APPARATUS, &c. FOR THE BLIND—UNITED STATES.

MR. C. STARR, of New York, exhibited books for the blind. Two Bibles, embossed with Dr. Howe's characters. Two leaves are pasted together, and a stout strip of paper stuck between and around these leaves, so as to form a rim to prevent the characters from being flattened on shutting and opening the book. This plan has also the same advantage as if each leaf were printed on both sides. The types are rather small, but the whole work is one of merit.

DR. S. G. HOWE, Boston, exhibited books for the blind ; his system has been fully described, and to it the Jury give the preference above all others.

MR. DODGE, Superintendent of the American Department, exhibited Xenophon and Virgil ; characters on Dr. Fry's plan, known as the Glasgow type, all in Roman capitals. This is the system adopted at the Manchester School for the Blind. It has been in use for about 15 years.

THE INSTITUTE FOR THE BLIND, Stanton, Virginia, exhibited specimens of books and types for the blind. The characters are capitals and lower-case ; the printing is sharp and good.

APPARATUS, &c. FOR THE BLIND—FRANCE.

M. MARCELLIN LEGRAND, Paris, exhibited type-plates to print in relief for the blind. The characters are rather too small, and possess the disadvantage of having both capitals and small letters.

APPARATUS, &c. FOR THE BLIND—AUSTRIA.

G. B. MARCHESI, of Lodi, exhibited a writing-machine for the blind, producing the characters in black or in relief. The letters are formed with pin points, and they are sufficiently tangible; but having capitals and small letters, this plan offers the disadvantage that two alphabets have to be learnt.

APPARATUS, &c. FOR THE BLIND—BAVARIA.

MM. FEHR and EISENRING, Augsburg, exhibited metal plates, with letters and characters in relief. The letters are too broad, and are not well adapted for the blind.

The Jury beg to suggest that a uniform system should be adopted, and that, in future, all books printed for the blind should be printed in the same character. Dr. Howe's plan appears simple, easy, and fit for general adoption.

II. BOOKBINDING.

Splendour in the binding of books is a taste which dates back from remote times. The rarity of manuscripts, and the ornaments of every kind with which they were enriched, rendered them so precious that they were exhibited upon desks for the purpose of gratifying the sight and the pride of their possessors. Seneca said of them: "*Plerisque libri non studiorum instrumenta sunt, ad ædum ornamenta.*" But if these rich bindings, some beautiful models of which still exist in public libraries, were suitable before or soon after the invention of printing, when books were almost as scarce as manuscripts, they are an anachronism, when we are compelled to heap them so closely in our libraries. These magnificent covers, executed for the greater part by jewellers, who enriched them with reliefs in gold, silver, steel, and ivory, with precious stones, with enamels, and with decorations of every kind, could only be suitable for the missals, and the antiphoners placed in churches. On seeing at the Exhibition, inclosed in the beautiful articles of furniture from Austria, the superb bindings in ivory carved with so much art, or in gold and silver inlaid with gems, and enamels still more precious, it might be supposed that these were shrines enclosing sacred relics, or even the casket of Darius, in which Alexander deposited the poems of Homer.

Between simple bindings and those in which costliness is carried to extreme, a medium may be found which lovers of books delight in, combining elegance with solidity and simplicity, qualities preferable to richness of gilding. At the period of the *Renaissance*, artists of great taste executed admirable bindings for kings, princes, and a few rich and learned *amateurs* whose names are preserved in the recollection of bibliopoles, who maintained in their houses binders whose taste they directed.* Some chose the Byzantine style; but the greater portion adopted the style called the *Renaissance*. After them, the binders confined themselves to imitation, applying this style of ornament indiscriminately to every species of book.

Some attempts have been made to submit bookbinding to general principles, and to adapt the binding either to the period in which the books were written, or

* This is probably the cause which has kept us in ignorance of the names of these artists.

according to the subjects of which they treat ; and a variety of ornaments have been devised in consequence. The idea, though a happy one, is not new, but has not generally been adopted. We have seen the cap of liberty, the owl, and the wand of Æsculapius applied to bindings with respect to the contents of the works. The Egyptian, Grecian, and Roman ornamental emblems have been resorted to, as well as the Gothic borrowed from monuments. Others have thought it desirable that bookbinders, departing from the beaten tract, should endeavour to give a more peculiar character to their bindings, a character which should mark our era ; and that thus the choice of colours—more or less sombre or more or less bright—might always be in accordance with the nature of the subject treated of in the books. They contend that this system would at once afford, in a large library, the advantage of facilitating the search for books by immediately striking the eye ; that it is also to be desired that certain styles of ornament should indicate whether such a work, on Egypt for example, belonged to the Pharaonic, the Arabic, the French, or the Turkish era ; and that it should be the same with ancient Greece, Byzantine Greece, or modern Greece, the Rome of the Cæsars or the Rome of the Popes.

All these suggestions may be useful if they are placed under the control of taste and judgment.

Modern bookbinding is carried on in England on a scale of such magnitude as the binders of former times could scarcely have foreseen. The production of books greatly exceeds that of any former period, and has caused the application of so much machinery to bookbinding, that it may fairly be said to have become a manufacturing business. Books, handsomely bound, gilt, lettered, embossed, and otherwise ornamented, no longer depend upon individual skill ; but are produced, with extraordinary rapidity, by the aid of machinery. Mr. Burn, of Hatton Garden, first introduced rolling-machines to supersede hammering ; the iron printing-presses of Hopkinson and others were altered to form arming-presses, by which block-gilding, blind tooling, and embossing can be effected with accuracy and rapidity. Leather covers, embossed in elaborate and beautiful patterns by means of powerful fly-presses, were introduced by M. Thousvenin, in Paris, about 25 years ago ; and almost simultaneously in this country by Messrs. Remnant and Co., and by Mr. De La Rue, who were quickly followed by others. Embossed calico was also introduced about the same period by Mr. De La Rue ; hydraulic presses, instead of the old wooden screw presses ; Wilson's cutting-machines, which supersede the old plough ; the cutting-tables with shears, invented by Mr. Warren De La Rue, and now applied to squaring and cutting millboards for book covers : all these means and contrivances, indispensable to large establishments, prove that machinery is one of the elements necessary to enable a binder on a large scale to carry on that business successfully.

Mr. STARR, of New York, had, in the United States department, two machines, one for backing, and one for finishing backs ; but the Jury were not fortunate enough to see them at work, although they made many applications for the purpose.

Binding in cloth-boards is carried on with such rapidity by houses like the Remnants, the Leightons, the Westleys, and others, that 1,000 volumes, can be put in cloth, gilt, in *six hours*, provided the covers be previously got ready, and this can be done in less than two days ! Notwithstanding all these numerous

improvements, the Jury could have wished for some advantageous and real progress in ordinary leather bindings, where large quantities are not bound at one time. Those in the Exhibition were generally well executed; but the price is still high in proportion to that of the books, the cost of which has been much reduced by modern improvements in printing and paper-making.

France applies binding in boards chiefly to ephemeral books, which must attract the eye by their splendour, and which are intended either to ornament the drawing-room tables or to be given as prizes, and especially to books which are exported to South America. The bindings in boards exhibited by M. MAME, of Tours, display elegance combined with a relative degree of solidity.

It is to be deplored that appearance should be so often preferred to reality, and that instead of the solidity which our fathers sought before everything, the inconsistency of our age should, by a contrary excess, prefer changeableness and variety. But, after all, books cannot be surrounded by too many attractions in order to inspire all classes with a taste for reading.

For bindings in boards a system has been for some time adopted, of employing ornaments allied by their style of design to the subject treated of in the book covered by them.

Amongst the beautiful bindings exhibited by the different bookbinders, the Jury have particularly remarked the works of the following Exhibitors:—

BOOKBINDING—ENGLAND.

REMNANTS and Co.—The design shows excellence and good taste; their workmanship is perfect; and in the application of carved wood to binding, by the patent mode of turning in the pattern, a great degree of beauty and cheapness, compared with carving, is attained.

J. S. EVANS, Berwick Street.—An imperial 4to album, bound in vellum, illuminated by Joseph Stuart Evans, with the rose, shamrock, and thistle, intertwined and inclosed within a border of gold and colours. The interior of the book embellished with illuminated pages of various designs, and on the inside of the covers the arms of Her Majesty the Queen and His Royal Highness Prince Albert, also illuminated by the same method. The clean and superior finish of this album deserves great praise. An album in the Etruscan style, black kid inlaid upon a brown ground, the edges of the leaves ornamented to correspond. The Art Union Illustrations of the "Pilgrim's Progress," bound in morocco, finished in outline; the subject, "Christian met by Evangelist." By lines and gouges; a style of decoration totally unsuited for the purpose. The gold is well worked and bright. The whole of the binding exhibited by Mr. Evans is well executed.

MESSRS. LEIGHTON, of Brewer Street.—These bookbinders evince, in various styles, great perfection, and all kinds of binding seem easy in their hands. Their manner of restoring fac-similes of missing pages to valuable works is first-rate. A quarto Lexicon, unfinished, showing a new mode of covering a book in such a manner as to preserve the strength of the leather at the joints. This appears to be an advantage. The taste displayed in the Royal Bible, with heavy ornaments, was inferior and of less happy adaptation to the subject than Luke Linmer's general designs.

Mr. JOSIAH WESTLEY.—Spenser's works in white vellum, a 4to Bible in Russia antique, and other specimens, show excellence in workmanship.

Messrs. BONE and SONS.—Their specimens of binding attracted the attention of the Jury by the cheapness and general excellence of their cloth binding.

R. J. HAYDAY sustains his well-earned reputation in the bindings exhibited by CUNDALL and ADDEY.

M. D. BATTEN, Clapham Common, London.—The books exhibited by him were elaborately worked, although requiring more careful attention in finishing.

J. WRIGHT, of Noel Street.—“Das Niebelungenlied,” royal 4to. A fine specimen of vellum illuminated binding, in the Grolier style, the design by an English workman. The price of binding 10*l*. “Pugin's Glossary,” royal 4to, inlaid illuminated morocco, well and expensively executed; the design taken from the contents of the book, and adapted to the decoration of the binding. The price of the binding, 10*l*. Owen Jones and Humphrey's illuminated books of the middle ages, imperial folio, dark-brown morocco, blind-tooled in imitation of the old monastic binding. The manner of fastening the leaves so as to open freely, by means of silk joints, appears superior to caoutchouc, where so large a book is required to open freely without twisting. Price of binding, 4*l*. “Silvester's Universal Paleography,” imperial folio, brown morocco; the sides beautifully and accurately tooled in the old French style, in gold. It is a first-rate specimen of forwarding, solidity, and correct workmanship. Price of binding, 4*l*. “Law's Domestic Animals of Great Britain,” chastely decorated and good workmanship. “Rogers' Poems,” and “Italy,” specimens of rich and accurate tooling, the edges marbled and well gilt over. “Mémoires de Napoleon,” royal 8vo. A specimen of emblematical binding. “Bohn's Standard Library,” in calf gilt, is a fine specimen of sound, durable, and useful binding, and the price moderate, being 3*s*. 6*d*. per volume. “Bohn's Classical Library,” as a revival of the English style of binding of the period of 1760, with highly raised boards, is another specimen of superior workmanship. The whole of the specimens justify the reputation Mr. Wright has acquired.

Messrs. WESTLEY and Co., of Friar Street, had, among other well-bound specimens, a royal folio Bible in purple morocco, bevelled boards, richly encased gilt clasps, corners, and centres. The interior of the boards worked in gold, the edges of the leaves illuminated in gold and colours in the missal style. The cost of this binding is 75*l*. The workmanship is highly meritorious, and proves that if work can be so well and elaborately executed, it is worthy of better designs.

Messrs. MACOMBE and Co., Percy Street.—A Cambridge folio Bible, red morocco, gilt centres, one in tortoiseshell and buhl; a royal 4to Bible in Russia, and numerous other specimens, showing many points of great merit, but somewhat deficient in the finishing, an error which could and should have been avoided, particularly where so much elaborate work is bestowed. The prices given are—

	4 <i>l</i> .	s.	d.
A Cambridge folio Bible, red morocco, elegant, gilt corners and centre, silk insides	25	0	0
A Cambridge folio Bible, tortoiseshell and buhl, silk insides, elegant	15	0	0
A London folio Bible, morocco buhl	15	0	0
A London demy folio Bible, bronze and blind tooled	5	0	0
A royal 4to Bible, Russia	6	10	0
A royal 4to Bible, maroon morocco, silk insides	7	10	0

	£.	s.	d.
A royal 4to Bible, brown morocco - - - - -	6	10	0
A royal 4to Bible, purple morocco, plates - - - - -	5	10	0
A crown 4to Bible, brown morocco, silk insides - - - - -	4	4	0
A crown 4to Bible, purple morocco, silk insides - - - - -	4	4	0
A crown 4to Bible, calf, imitation wood - - - - -	2	2	0
A crown 4to Bible, velvet-pierced, gilt sides - - - - -	8	10	0
A royal 4to Prayer-book - - - - -	8	0	0
A royal 8vo Prayer-book - - - - -	5	0	0
A pica 8vo imperial Bible, inlaid - - - - -	5	0	0
A long primer 8vo reference - - - - -	2	10	0
A Boccaccio, vellum, illuminated - - - - -	7	0	0
A crown 4to Bible - - - - -	7	0	0

Mrs. LEWIS, Duke Street.—“Horne’s Commentary,” “Glossary of Architecture,” and other works, among which was one in the Gothic style, all bearing evidence of good and careful workmanship.

Messrs. BARRETT and Co., Fleet Street.—Specimens of carefully and well-executed work, among which is a royal 4to Altar Service, ultramarine border round the pages, and carved wood boards, covered in Turkey morocco, the electro-metal corners and centres deserve mention. Mr. Barrett had also numerous small Common Prayers and Church Services, perforated and engraved, solid covers, &c.

Mr. P. SAPSFORD, London.—An illuminated and elaborately finished 4to Bible, in red morocco, with metal edges.

Mr. TARRANT, London.—The Works of Sir Thomas Lawrence, morocco illuminated, neatly bound.

Mr. NEIL, Edinburgh.—An imperial 4to Bible, white morocco, super-extra, morocco inside, with satin fly-leaves, the outside of the boards and back hand-tooled and illuminated. A fine specimen of what can be effected where care and judgment in the execution are combined, even under the disadvantages of working after a day’s hard labour, this Bible having been bound in the winter evenings, by gas-light, after Mr. Neil’s daily occupation.

Mr. BUDDEN, Cambridge.—An Album, inlaid in colours, with interlacing band-pattern, inside joints, and inlaid vellum, gilt and painted, displaying great care, skill, and taste in the execution.

Mr. ORR, London.—A number of volumes neatly blocked, and a thin book under the title of “Fiddy,” very neatly bound.

Mrs. LEIGHTON and SOX, Harp Alley, London.—Various specimens of blocking, some in silver, said to be protected from tarnishing. “The Women of the Bible,” a volume showing good block-gilding.

Mr. RIVIERE, Great Queen Street.—A volume, “Virgilii Opera,” royal 8vo, inlaid white morocco, inside covers tooled in foliated curves, beautifully put out of hand; “The Chronicles of England,” 4to, tree-marbled calf, also a fine specimen of this style of binding.

Mr. JOHN CLARKE, of Frith Street, Soho.—Sir Joshua Reynolds’ “Discourses,” and a folio Bible in the Harleian style; a Bible in antique morocco, single hand-tooling, remarkable for its extremely well forwarded and finished style of work. Four volumes in calf, tree-marbled, in which Mr. Clarke excels.

Mr. MACNAIR, of Glasgow, Mr. CLARK, of Dunfermline, Messrs. CLARK and DONALDSON, of Mauchline, exhibited specimens of average workmanship.

After having attentively observed the amount of elaborate work which is bestowed on most of the productions exhibited by the bookbinders of the United Kingdom, the Jury cannot disguise the fact that there is a general want of good designs; and they beg to remark that more attention should be paid to a subject which impresses a special character on the products of a country. The attempts at emblematic binding are generally not very successful; but the imitations of the old English style of bindings are a nearer approach to simple, useful, and good work.

BOOKBINDING—FRANCE.

M. NIÉDRÉE, of Paris, exhibited numerous works, among which several are forwarded, designed, and finished in a first-rate style. The ornamental tooling in gold is a near approach to all that can be desired.

A. LORTIC, Paris, among other works bound in a superior manner, a large folio "*Balbus de Janua*," illuminated Greslier intersected pattern, with the insides elaborately gilt, is deserving of high praise. Some few specimens of very thin books displayed a degree of skill seldom surpassed.

MADAME GRUEL, Paris, exhibited a smaller number of elegantly bound books than could have been expected from her known establishment. Those that were in her glass-case were principally ornamented in elaborately carved wood and ivory. A large folio "*Espana Artistica y Monumenta*," red morocco illuminated, intersected pattern, deserves commendation for its elaborate workmanship.

M. SIMIER, of Paris: this name brings back recollections which impose duties on his successor, whose specimens contain merit of only an average kind.

M. LE BRUN and M. AUGUSTE DAUTHUILLE, of Paris, exhibited bindings of an average description.

The Jury regret that MM. BEAUZONNET, OTTMAN, CAPE, and other eminent bookbinders in Paris, have abstained from sending their works to the Great Exhibition.

In general, the bindings of French artists are remarkable for a superior degree of taste in their design, as well as for neatness of execution in the hand-tooling and finishing. Their best designs, however, are imitations of old artists.

BOOKBINDING—AUSTRIA.

Bookbinding on a large scale is carried on in Vienna and in Prussia, where also the manufactory of fancy leather articles has considerably increased of late years.

The principal part of the specimens exhibited were placed in M. LEISTLER'S rooms, inclosed in a bookcase; and as the Jury were informed that these goods were private, there was a certain degree of delicacy in asking more than once for leave to inspect them. The names of the binders and ornamenters of the books and album-cases were not found by any number affixed to the cases, and it was not until the 20th of June that it was communicated to the Jury that the books, &c., were exhibited by individual persons who were desirous that they might not escape notice.

The designs of the portefeuilles exhibited by M. HABENICHT, bookbinder of Vienna, are by Professor CHARLES RAESNER and Professor VAN DER NULH, and show what can be accomplished when artists are employed, instead of leaving the

workman to follow his own notions of what constitutes appropriate ornamentation. These portefeuilles got up by M. Habenicht can only be noticed in this place for the very superior workmanship displayed in gilding and ornamenting, for they do not constitute bookbinding in its strict meaning. All the portefeuille-cases in the shape of books are specimens of first-rate workmanship and appropriate design, and reflect great credit on M. Habenicht and the artists who designed them.

The following is a list of six of those elegantly finished and ornamented productions:—

An elephant folio, in dark-blue velvet cover, with the figure of our Saviour and Cross, in chased silver, in the centre.

An elephant folio, green velvet, with exquisitely pierced ivory ornaments.

An elephant folio with tortoiseshell cover, profusely ornamented with inlaid metal ornaments, Gothic design, pierced ivory, and coloured glass border, silver and gilt device of three figures in the centre; the lettering in exquisitely formed raised letters of metal gilt.

An elephant folio, in blue and red morocco, illuminated in gold, with rose bouquet, and raised intersected ornaments, in ten compartments, each filled with highly finished tableaux.

An elephant folio, in dark puce velvet, raised gold ornaments, with three small ivory figures, and beautifully carved ivory ornaments round the sides.

An elephant 4to, light purple velvet, profusely ornamented with gilt metal, ebony, and pearls; females playing harp and lute in the centre, in gilt metal. Raised gilt letters, top, bottom, and sides.

M. GIRARDET, of Vienna, had also two beautiful portefeuilles, designed by Professor Charles Raesner, and of perfect workmanship. One an elephant folio, covered in light blue, red morocco tooled border, gold and ivory scroll ornaments, gilt metal centre, with female figure holding a tablet, in gilt metal, on a brown ground, with the names of celebrated Austrian music composers—perfect in the forwarding and finishing. The other an elephant 4to, in dark-blue velvet, bronze and gilt metal, raised intersected pattern in fourteen compartments, ornamented with gold, with highly finished drawings of the costumes of Austria, and the imperial arms in the centre, in bronzed and gilt metal.

M. GIRARDET had also in the bookcase upwards of 200 volumes of books, exquisitely bound. The whole of M. Girardet's productions were supposed to be with the bookcase, and not exhibited for competition, and no information was afforded to the Jury to enable them to view them as a collection placed there by an exhibitor—there was neither number nor name to indicate who was the binder. Considering the superior workmanship, it is probable that M. Girardet would otherwise have received the marked approbation of the Jury by their awarding him a Prize Medal.

BOOKBINDING—THE ZOLLVEREIN.

Only two bookbinders have submitted specimens, although some of the booksellers and printers, combining this branch of the book trade, had also some bound works. M. SCHOENING, of Berlin, exhibited a large Altar Bible in morocco, well bound. M. GRAF, Duchy of Saxe Altenburg, a large Altar Bible in purple morocco;

as a specimen of block gilding it is perfect, and considering the large size of the engraved block, which is stated to be in one piece, much skill is displayed in its being so skilfully applied.

BOOKBINDING—NETHERLANDS.

M. REGEER, of Rotterdam, exhibited the works of Hogarth, in folio, as a specimen of binding, neatly and carefully executed.

BOOKBINDING—SWEDEN.

M. F. BECK, of Stockholm, exhibited ten specimens of binding, possessing fair merit.

BOOKBINDING—UNITED STATES OF AMERICA.

Judging from the collection in the American department, bookbinding has not advanced in that country as much as some other branches of the book trade. The works exhibited are loosely forwarded, and twist in handling; and although much labour is bestowed in gilding and finishing, sufficient attention is not paid to the minor details on which good workmanship so much depends. The following is a list of the exhibitors:—Mr. B. BRADLEY, Boston—books in cloth, well blocked. These specimens were enclosed in a case in the form of an immense book, well and neatly covered. Mr. HENRY GOSSET, Boston, and Messrs. LIPPINCOTT, GRAMBO, & Co., of Philadelphia—specimens of binding, of moderately good workmanship. New York, Mr. G. P. PUTNAM—five or six specimens of mediæval binding. Messrs. WALKER & Co., New York—a large 4to Bible in two vols., bound in Gothic style, green morocco, gilt metal ornaments and corners, most elaborately worked fly-leaves, illuminated in green, red, and white, with recesses in each side for a family register, embellished paper, and finished in such a manner that when the recesses are shut up the inside of the cover remains even. This is the best specimen in the American department, and possesses some novelty and care in forwarding and finishing.

BOOKBINDING—VAN DIEMEN'S LAND.

The COUNCIL OF THE ROYAL SOCIETY OF VAN DIEMEN'S LAND displayed a collection of books neatly bound by Mr. ROLWEGAR, of Hobart Town; and one volume, said to be gilt and lettered with gold leaf from Californian gold, manufactured by Mr. R. V. HOOD, also of Hobart Town.

Vellum Binding.

Vellum binding is a separate branch of the trade, and consists in binding all kinds of account books, from the largest ledger to the smallest memorandum book. The covers are usually vellum, forril, Russian leather, smooth and rough calf, and the larger books are in general neatly worked with Russia bands, which add both to their appearance and durability. The English vellum binders, whose works were in the Exhibition, fully sustain their high reputation for beauty of execution and solidity of workmanship. The ledgers of MM. GAYMARD and GERAULT, of Paris, however, show that remarkable progress has taken place in France within the last 10 years,

in this branch of trade. In the American department, also, Mr. HERRICK and Messrs. J. and W. McADAMS, of New York, had ledgers ruled in a very superior manner. An improved mode of numbering the leaves of account books has been introduced within the last few years, by means of a paging machine, patented by Mr. Shaw. There are other machines for the same purpose, and Mr. SCHLESINGER had one at work in Class XVII. during the whole of the Exhibition, which is very simple in its construction, and appears to answer the purpose, although it may be less durable than Shaw's. Mr. Hancock took out a patent some years since for the purpose of applying caoutchouc to the manufacture of account and other books: the leaves are fastened together with caoutchouc in a semi-fluid state, instead of stitching them, thus obtaining much greater freedom in opening when the book is bound: this appeared at first to be a superior mode, and promised to supersede all others. It was not found, however, to be sufficiently strong to sustain the severe wear and tear consequent on the constant opening and shutting of ledgers. It is a process by which books that do not require such constant handling may be bound to advantage, as they open much more freely. It appears admirably adapted for music-books, albums, small pocket ledgers, and similar works.

The English exhibitors of account books were Messrs. THOMAS and SON, Cornhill; JOHN WILLIAMS, of Bucklersbury; EVANS, Berwick Street; HARRIS and GALABIN, Fenchurch Street; ROYSTON and BROWN, Broad Street; WATERLOW and SONS, London Wall; COWAN and SONS; DE LA RUE and Co., for pocket ledgers; and Mr. WODDERSPOON, whose new mode of fastening the sections with cloth bands appears to be an improvement.

From France, MM. GAYMARD and GÉRAULT exhibited an immense and well-bound ledger; and M. NÉRAUDEAU, whose various account books were of an average quality. From America, Messrs. SIBELL and MOTT, New York, in addition to those already mentioned.

III. PAPER.

The introduction of paper, first made of cotton, and afterwards of linen rags,* dates from the arrival of the Arabs in Spain and Sicily, in this part of Europe, and from the time of the Crusaders as regards the Southern portion. Thus it is from two different parts of the East that we have derived this process, originally invented in China, where the art of making sheets of paper from the bark of trees, from bamboo, old rags, silk, hemp, or cotton, reduced to pulp, dates from the commencement of the second century of the Christian era.†

The use of papyrus, manufactured in Egypt, ceased in Europe about the ninth century, and the cotton paper, then in great use in the East, was introduced into Europe at this time, through the commercial relations of Venice, Naples, and Sicily.

Edrisi, who wrote in 1150, tells us that the paper made at Xativa, an ancient city of Valencia,‡ was excellent, and that it was exported to the East and West.

* "*Ex rasuris pannorum*," are the words of Peter the Venerable, Abbot of Cluny.

† Between the years 89 and 105 after the birth of Jesus Christ.

‡ Xativa is a pretty town, with castles, the beauty and solidity of which have passed into a proverb; here is made paper, the equal of which cannot be found in the whole universe. It is exported to the East and West.—(Geography of Edrisi, translated by A. Jaubert, vol. ii., page 37.) Xativa is now called San Felipe.

At the commencement of the fourteenth century there existed at Fabriano, in the Picenum, and at Colle, in Tuscany, paper-mills moved by streams of water.* It was from these Fabriano mills that Bodoni, at the commencement of the present century, obtained the paper for his beautiful editions; and this manufacture is still carried on with success, judging from the superb vat-made paper exhibited by M. MILLIANI, of Fabriano.

At Nuremberg, in Germany, a paper-mill was established in 1390.

The introduction of paper-making in France dates from the fourteenth century. The towns of Troyes and Essonnes are the first quoted in relation to this manufacture.

In England the manufacture of paper was introduced much later,† and was imported from France. Yet it appears by verses, in a book printed in 1496, by Wynkyn de Worde, under the title of *Bartholomæus de Proprietatibus rerum*, that the paper had been made for it by John Tate, jun., at his mill in Stevenage, Hertfordshire. Probably the manufacture was not successful, for it was in 1558 that Queen Elizabeth granted to her jeweller, John Spelman, the right to erect a paper-mill, which was established at Dartford: this has been erroneously stated to have been the first put to work in England. So late as the middle of the last century, only very common paper, principally wrapping, was made in Great Britain. It was not until 1770 that the celebrated J. Whatman established fine paper-making at Maidstone, in Kent, after his return from the Continent, where he had worked as journeyman in most of the principal paper-mills.

When the art of paper-making was first introduced into Europe, parchment (sheepskin), or vellum (calf-skin), was used for writing and printing. In place of these substances, paper was required to possess greater strength and solidity than that made of cotton; it was therefore manufactured of hemp and linen rags, not weakened by bleaching, according to the present mode, which, by removing the natural gum enveloping vegetable fibres, injures them more or less. It is remarkable, that these old papers, having been well-sized with gelatine, preserve their original qualities to this day.

In 1750, Baskerville, to obviate the roughness of the laid paper of that time, had it made on wove moulds; his beautiful edition of Virgil, 1757, is chiefly printed on this wove paper. This attracted the attention of M. Ambrose Didot, who employed M. Johannot, of Annonay, to make similar paper, which he called "vellum paper" (*papier velin*).‡ Until that period the rags were reduced to pulp by means of stampers, a slow process, requiring considerable motive power; to remedy this, cylinders with sharp steel blades for tearing the rags were invented in Holland, where the windmills, then used for giving power, were found inadequate to put these stampers in regular and constant motion. Holland still maintains a high reputation for its hard-sized hand-made laid writing-papers, as was shown by those exhibited in the Dutch department.

* The Charter of the 6th of March 1377, relates to the lease of a mill with a waterfall, *ad faciendas cartas*.

† See the argument of De Thou, in favour of the 24 sworn booksellers,—*Parliament Records*, 17th January 1564.

‡ The first specimen is in one of the volumes of the collection which he printed for M^{onsieur} le Comte d'Artois (Charles X.).

At the end of the last century (1799), the first trial was made at Essonnes, in France, in the paper-mill of M. Francois Didot, of a machine for making continuous paper. It was the invention of M. Robert, a workman in that establishment, who obtained a patent for 15 years, and a sum of 8,000 francs from the French Government. Some sheets of paper in continuous lengths were then made; but the troubles in which France was involved at that time caused delay in the necessary experiments, which were both tedious and expensive. As soon as the Peace of Amiens restored intercourse with England, M. Didot, jun., convinced of the great utility of the invention, came over with it to seek in England what was then wanting in France—capital engineers and enterprising paper-manufacturers; he was accompanied by Mr. John Gamble, his brother-in-law, who had resided several years in Paris. Having obtained patents in England, one in 1801 and the other in 1803, they were assigned to Messrs. Henry and Sealy Fourdrinier in 1804. Dartford, in Kent, was selected as the place best adapted for realizing the patentees' plans, and Mr. Hall's establishment as the fittest engineering concern for that purpose. In that manufactory, Mr. Bryan Donkin, since so celebrated as a paper-machine maker, was employed; and to this gentleman the credit of perfecting the paper-machine is mainly due. In 1803, after intense application, Mr. Donkin produced a self-acting machine, or working model, which he erected at Frogmore, in Hertfordshire; and in 1804 he put up the second machine at Two Waters, which was completely successful; and the manufacture of continuous paper became one of the most useful discoveries of the age. In the first ten years from 1803, Messrs. Donkin made and set to work 13 paper-machines; in the second ten years they put up 25; and in the present year, 1851, Messrs. Donkin and Co. are making their 191st machine. Of these 83 have been made for Great Britain, 23 for France, 46 for Germany, 22 for the North of Europe, 14 for Italy and the South of Europe, 2 for America in 1826, and 1 for Mr. Marshman, for India, in 1825. The first machine made by them for France was sent to M. Canson, in 1822; the second, in 1823, to M. Maupéau; and the third, in 1825, to M. Didot. The first machine made by Messrs. Donkin for Germany was in 1818, for the Prussian Government, sent to Berlin; the second, in 1823, for M. Rauch, of Heilbronn. The first machine sent to Russia was in 1835, for Moscow. In 1837, one for the Bank of Poland, sent to Warsaw. In 1805 Mr. Donkin altered the position of the cylinders, so as to dispense with the use of the upper web, an improvement by which the machine was much simplified—the paper on the web being slightly pressed before passing through the pressing rollers—thus an all-important advantage was attained.

In 1809, Mr. Dickinson, paper-maker, invented another method of making endless paper. It consists in causing a polished hollow brass cylinder, perforated with holes or slits, and covered with wire-cloth, to revolve over and in contact with the prepared pulp; the cylinder being connected with a vessel from which the air has been exhausted, the film of pulp adheres to the hollow cylinder. It is then turned off continuously upon a solid one covered with felt, upon which it is condensed by the pressure of a third revolving cylinder, and is thence delivered to the drying rollers—See Ure's Dictionary, article *Paper-making*. In 1826, M. Canson, of Annonay, first applied suction-pumps to the Didot and Fourdrinier machines. He kept it secret for six years and in 1832 communicated it to Messrs. Wyse and Middleton.

In 1836, Mr. Brown, of Esk Mills, near Edinburgh, obtained a patent for applying suction-pumps to the Fourdrinier machine. He places a rectangular box transversely beneath the horizontal wire-cloth, without the interposition of any perforated covering.

In April 1839, Mr T. B. Crompton took out letters-patent for producing a partial and continual vacuum under the wire by means of a fan ; and a uniform rarefaction is obtained by this arrangement. It has been successfully applied since that period at his extensive mills, Farnworth, near Bolton, Lancashire.

The first machine for continuous paper actually made in France was constructed at Sorel, near Anet, by Messrs Berte and Grévénich, under the directions of M. Didot, who had obtained a patent in France. M. Calla, an ingenious French mechanic, was the maker. The machines first made in France were very inferior to those made by Messrs. Donkin, consequently he supplied the principal paper-makers in that country with machines made by him in England.

Notwithstanding the great benefits derived by the perfection of the Didot and Fourdrinier paper-machines, and the immense quantities of paper produced by these machines, it was not till 1821 that the advantages of this invention were fully developed. This was effected by Mr. T. B. Crompton, who took out a patent on the 1st of November 1820, for "drying and finishing paper by means of a cloth or cloths, against heated cylinders, and the application of a pair of shears to cut the paper off into suitable lengths, as it comes from the machine or rollers." The old tedious and expensive process of drying in lofts was no longer necessary. The paper was much better finished and cut than had been found possible until this improvement. Through the imperfection of the patent laws of that period, a number of persons eventually succeeded in setting aside Mr. Crompton's patent.

In 1828, Mr. T. B. Crompton, in conjunction with Mr. Enoch Taylor, obtained a "patent for cutting paper longitudinally, by means of revolving circular blades."

In 1826, Mr. Firmin Didot introduced into his mill, at Mesnil, Mr. Crompton's drying process. This was the first time that it was put into operation in France.

Fine writing-paper is now made, sized with gelatine, dried, and cut into sheets, at the rate of 60 feet a minute in length, and 70 inches in width, at the works of Mr. William Joynson, at St. Mary Cray, Kent, which produces, from only two machines, the large quantity of 25 tons per week.

The paper used in England for newspapers is required to be very strong and firm : to obtain these qualities it is sized with gelatine. To Mr. T. B. Crompton is due this mode of sizing with rollers. The amount of Excise duty on paper made by him has been no less than 15,000*l.* per annum, taking an average of ten years, and now exceeds 20,000*l.*, giving the enormous weight per annum of 1,400 tons.

In August 1830, the late Mr. Thomas Barratt, of St. Mary Cray, obtained a patent for inserting the water-mark and maker's name to continuous paper, so as to resemble, in every respect, paper made by hand. It is to this ingenious man that we are indebted for the improved means of finishing paper, owing to the perfection he attained in making cast-iron rollers truer than was possible by the old mode of turning them in a lathe. This consists in grinding the rollers together, allowing merely a small stream of water to flow over them, without emery or any other grinding material ; and, by continuing the operation for many weeks, true cylinders

are obtained. This is the mode now adopted in finishing rollers for all purposes requiring great accuracy.

In August 1831, M. Jean Jaques Jequier obtained a patent for making continuous paper with wire marks, similar to the laid papers usually made by hand ; to which the preference was still given for their greater strength and peculiar appearance.

In 1830, Mr. Ibotson, of Poyle, paper-maker, obtained a patent for a peculiar construction of strainers. He intrusted the getting up of these strainers to Messrs. Donkin, who used great care in their manufacture. By Mr. Ibotson's simple contrivance, the sand, lumps, knots, and other impurities, are kept from flowing with the pulp at the moment of its running on the wire web on which the paper is formed. Most countries have since adopted these strainers ; and paper is now free from the imperfections which formerly caused so much damage to types in the printing, spoiling large founts and valuable woodcuts, after they had been in use only a short time : this great improvement also superseded the operation of picking the lumps, &c., after the paper was made, which caused so much retree (damaged paper) to otherwise good and well-made paper. Other kinds of strainers are used ; but few are found to work as well as Ibotson's, made by Donkin and Co. Mr. John Wilks, a partner in the firm of Donkin and Co., obtained a patent in 1830 for a channelled and perforated roller, technically called a "dandy," to remove part of the water from the pulp, to facilitate couching, to enable paper to be made with increased rapidity, and to close its upper surface. To this gentleman manufacturers are greatly indebted for many valuable suggestions and improvements in the numerous utensils and implements required in the making and finishing of paper.

In England, writing-papers are sized with gelatine, and are stronger and harder than those of other countries : they are also cleaner, generally better *put up*, and show greater care in the manufacture than those of France and of other countries. The old cream-laid papers, now so fashionable in England, were re-introduced by Messrs. Hollingworth, of Turkey Mill, Kent, a few years since, and they are still preferred for letter and note paper. The thinnest post writing-papers, however, are much better manufactured in France, Belgium, and other parts of the Continent, than in England. Those exhibited from Angoulême in France, and Heilbronn in Germany, are the best ; those made in Belgium are not sufficiently hard-sized. Notwithstanding the high protective duty of 4*d.* per lb., a considerable quantity of these thin writing-papers is imported into England. The white of the letter-papers of France, Germany, and other foreign countries, is of great purity and beauty ; and these papers, being sized in the vat with farina, in addition to rosin soap, instead of gelatine, they are less greasy under the pen,* and consequently can be written on more freely than those which are sized with animal size ; they do not, however, bear the ink so well. English printing-papers generally maintain a superiority over those of foreign countries ; and in drawing-papers and strong account-book blue-laid papers, England stands unrivalled. Tinted printing and drawing-papers, formerly made exclusively in England, are now produced by

* Mr. Joynson, since the Great Exhibition, has remedied this inconvenience by a very ingenious process.

most foreign paper-makers, who also make the tinted writing post-papers, long out of fashion in this country. M. OBRY, of Prouzel, exhibited well-made black papers, for wrapping, cambrics, lace, &c. Black papers of the same kind were made in Ireland and Manchester more than 25 years ago.

M. JOURNET, of the Souche Paper Manufactory, exhibited printing-paper of a good colour, said to be bleached without the use of any acid; rose-colour tissues of great brilliancy, dyed with safflower, and filtering-paper for chemical purposes, which, probably owing to the granitic and silicious soil through which the Souche waters flow, seems to combine all the best qualities of the Swedish paper originally manufactured under Berzelius' directions. A sheet of M. Journet's filtering-paper, weighing 9.6970 grammes, and having a surface of 0.2336 metres, analysed by M. Bareswil, gave in ashes only 0.0293; so that 100 kilogrammes of this paper would yield only 302 grammes of ashes, being only three parts of ashes from one thousand parts of paper—a very favourable result.

The so-called "fire-proof cartridge-paper," made with animal substances invented by M. Mérimée, and exhibited by MM. ODENT, BLANCHET, and KLEBER, of Rives, and by M. MONTGOLFIER, of Annonay, deserves particular mention. It approaches parchment in strength and solidity, and is valuable when used instead of felt in making gun-cartridges; for should it catch fire, the fire does not spread as in paper, but goes out instantly. M. Odent was the first to apply M. Mérimée's invention under that gentleman's instruction, and he exhibited sheets as a substitute for parchment-binding, or for valuable records; its yellow colour, however, is objectionable, but it may perhaps be improved. M. Montgolfier has also applied this animal paper, instead of parchment, to the use of spinning-mills and to gold and silver beaters' purposes.

Sizing in the vat offers many advantages, but as a gelatine cannot be employed without injury to the felt during the process of manufacturing paper, substitutes for gelatine were desirable; and in 1827 M. Canson made size, of which wax was the base, and M. Delcambre made another, the base of which was rosin: neither seems to have answered the purpose, for Mr. Obry's plan of using alnm and rosin, previously dissolved in soda, and combining it with potato-starch, which he adopted in 1827, is the method now generally followed in France for writing and printing papers. In England, for printing-papers, the rosin size is also the one in use; the addition of potato-starch has been attempted, but not very successfully, probably from the quantity of cotton rags used, which seem not readily to take the size made with starch. For writing-papers, gelatine is still preferred in this country, and is an after process.

Glazing of Paper.

High glazing, now universally adopted, was first introduced by the late Mr. Heath, about 35 years ago, at his pasteboard manufactory in Hackney, and for many years the means he adopted were not known. On the introduction of steel pens, there was an increased demand for smooth papers, and a desire to obtain the highest possible finish. Other card and drawing-board makers applied Mr. Heath's process, and it became the custom for wholesale stationers to send post and other writing papers to the card-makers to be glazed or satined. A patent having been granted in 1832 to Mr. De La Rue, for "certain improvements in playing-cards," in which he

applied printing in oil, instead of the old way of stenciling with water colours, he adopted the mode of passing them between copper sheets through powerful rollers, instead of the usual mode of glazing by friction with a flint, and subsequently he attained a higher finish in fine writing-paper than had hitherto been effected by submitting it to the same process.

Glazing is now carried on at most of the paper-mills, in all countries. Writing-papers have also been glazed in long lengths; but as the naked rollers through which the paper passes became indented after having been only a short time in use, this plan has been abandoned. A better mode is to pass the paper several times through a calendar, having an iron roller at the top and bottom, and a paper roller in the middle, the iron rollers being slightly heated by steam. This plan is useful where cheapness is necessary; but it is nevertheless an inferior sort of glazing, and does not long maintain its gloss. It has been practised many years by Mr. Crompton for strong brown packing-papers. The WEARMOUTH PAPER COMPANY exhibited, through Messrs. Venables, a fine specimen of brown paper glazed in long length; and Messrs. DREWSEN and Co., of Silkeborg, in Jutland, Denmark, have exhibited a large roll of cream-laid writing-paper well glazed, *not satined*, in long length. There is no difficulty whatever in glazing paper in long lengths, provided care be taken to obtain very true rollers. A thin ductor-blade should be fixed in a proper position to detach the sheets as they pass through, as the electricity which is developed causes them to adhere to the cylinders, particularly where rosin size has been used.

Paper Bleaching.

At the end of the last century, M. Berthollet's discovery of the means of bleaching with chlorine was successfully applied to paper-making; and by this valuable process coloured rags, ropes, &c., were converted into fine white paper, but the improper use of it deteriorated the quality, and recourse was therefore had to the use of chloride of lime, and to a better system of washing the pulp, for which purpose washing drums were introduced by Mr. Breton and perfected by Messrs Blanchet and Kleber. As a further precaution against the deteriorating effects of the use of chlorine or its compounds, some makers use anti-chlor, such as sulphites, to neutralize the small particles which might still remain in the pulp after bleaching and ordinary washing.

The rotatory rag-washing machine, invented by Messrs. Donkin, has the advantage of enabling the boiling operation to be performed under high-pressure: the mechanism continually lifting the rags out of the lye and plunging them back ensures complete and uniform action. The lye may be used repeatedly by adding fresh doses of alkali. M. Journet has adopted the plan long followed in England of using the waste wash-water of his mills for manuring land.

The chloride of lime is cheaper in England than in France; it is made principally at Glasgow as a secondary product of the soda manufacture; the price is 14s. per cwt. (about 30 fr. the 100 kilogrammes), whilst at Rouen or Paris it costs 47 fr. the 100 kilogrammes, being 56 per cent. dearer, a disadvantage to which the French manufacturer is subjected on one of the most important raw materials used in paper-making, as the importation of chemical productions is prohibited in that country. The difference of price is from the great disparity in the cost of fuel;

coals are sold in England at an average of 4s. per ton (5 fr.); in London 15s., or 18 fr. At Rouen, coals cost 33 fr. per 1,000 kilogrammes, to which must be added the cost of cartage to the different mills.

Paper.—Motive Power.

The use of steam as a motive power has become almost universal in England, Holland, and Belgium, where there are fewer waterfalls than in France and other parts of the Continent. Although steam is more expensive than water power, it is more available, and mills using it are not subject to stoppages from floods and shortness of water.

In France and other countries where mills are near large forests, it is cheaper to use wood than coal; but England has great advantages from the cheapness of its fuel, particularly for steam drying. Where mills are in unfavourable situations, without coal, the cost of drying the paper is considerable.

England and France obtain the greater quantity of manganese from Germany; the price of which is therefore about the same in both countries. Rosin is imported from America and Russia, and some is produced near Bordeaux. Alum and potato-starch are about equal in price in England, France, and Germany. Muriatic acid is dearer in England than in France, where the price is now very much reduced.

Paper.—Price of Labour.

Although the price of labour is, in general, higher in England than on the Continent, yet owing to the care and skill of the English workmen, and the great superiority of the machinery employed, it is doubtful whether the cost of the manufacture of paper be not as cheap in England as in other countries. To ascertain the merits of the manufactures, quality and price of the paper being considered, it would be necessary to have exact data as to the rate of labour in different countries, and even in each locality, as the price varies according to the greater or less distance of the mills from the capital; for example, in France the price of labour in the Vosges is much less than near Paris, but this advantage is counterbalanced by the expense of carriage, which is always greater in the case of mills distant from the centre of consumption. These points have been considered by the Jury according to the best information obtained, and they find that mills established where civilization has made little progress are the most favourably circumstanced. The price of rags mainly regulates that of paper, and the value of rags is always in proportion to the degree of civilization and prosperity of a country. Thus Smyrna, which some years ago converted its rags into coarse boards, and sold them to the paper-makers of Europe for making paper, now makes good writing and other papers, the low price of which proves that both the raw materials and the labour must be cheap in that part of the world.

In proportion to the progress of civilization, paper-machines have been introduced into the different parts of the world. North America possesses a great number. South America has now begun to obtain them from the United States. In Africa there is only a small vat-mill at Boulac, near Cairo.

The following is an account of the number of paper-mills in England, Scotland, and Ireland, and the number of beating-engines employed; also the amount of duty

charged on paper, the quantity imported from various countries, and the amount exported from Great Britain in the year 1850:—

	England.	Scotland.	Ireland.
Number of paper-mills - - - - -	327	51	37
Number of beating-engines - - - - -	1,374	286	86
Paper charged with duty - - - - lbs.	105,712,953	28,000,019	6,719,502
Amount of duty - - - - -	£ 693,741	£ 187,687	£ 44,096
<i>Paper Imported, viz.—</i>			
Printed, painted, stained, or hangings, sq. yds.	342,746	470	-
Other kinds - - - - - lbs.	267,162	53	-
Amount of duty - - - - -	£ 5,607	£ 5	-
<i>Paper Exported, viz.—</i>			
Printed, painted, or stained - square yards.	1,155,012	163,164	-
Other kinds - - - - - lbs.	6,568,268	1,040,555	9,248
Amount of drawback paid - - - - -	£ 43,934	£ 6,946	£ (2)

By a Parliamentary paper, published March 9, 1852, the number of paper-mills at work in England on the 18th February 1852, was 304 in England, 48 in Scotland, and 28 in Ireland, making 380. There were 1,616 beating-engines at work, and 130 silent.

Sharp, in his "Gazetteer," ed. 1852, p. 977, states the number of paper-mills to be 800, employing 30,000 hands; but the above table, obtained officially from the Inland Revenue Office, gives the number of mills as being only 415, including England, Scotland, and Ireland.

An Account of the Number of Machines and Vats employed at Paper Mills in the United Kingdom, distinguishing England, Scotland, and Ireland, in the last 10 Years.

YEARS.	England.		Scotland.		Ireland.		United Kingdom.	
	Number of Machines.	Number of Vats.	Number of Machines.	Number of Vats.	Number of Machines.	Number of Vats.	Number of Machines.	Number of Vats.
1842	292	311	46	21	18	40	356	372
1843	298	300	47	24	22	38	367	362
1844	299	302	48	25	23	32	370	359
1845	310	309	50	25	24	30	384	364
1846	308	328	51	22	25	28	384	378
1847	320	326	54	20	31	27	405	373
1848	321	321	54	21	32	25	407	367
1849	319	310	55	19	32	24	406	353
1850	323	307	57	19	32	18	412	344
1851	322	296	58	19	33	15	413	330

*Inland Revenue Office, Old Broad Street,
14th October 1851.*

The amount of duty charged in the year 1850 shows the enormous amount of sixty-two thousand nine hundred and sixty tons weight of paper produced in Great Britain in one year! The first paper-machine was erected in 1804.*

* Anderson, in his "History of Commerce," states, that it was in 1690 that paper was first manufactured in England; until that period France exported paper to England to the amount of 100,000l. yearly.

The annual value of paper manufactured in this country is said to be two millions sterling.—*Vide* "Sharp's Gazetteer," 1852.

The following is a list of the principal sizes of writing-paper in English inches, and in French centimètres, to the nearest millimètre or tenth of a centimètre, which will be found useful to stationers and all connected with the paper trade :—

	Inches.	Centimètres
Double elephant - - -	40 - 26 $\frac{1}{2}$	101·6 - 67·9
Atlas - - - - -	34 - 26	86·4 - 66·0
Colombier - - - - -	34 $\frac{1}{4}$ - 23 $\frac{1}{4}$	87·6 - 59·7
Imperial - - - - -	30 - 22	76·2 - 55·9
Elephant - - - - -	28 - 23	71·1 - 58·4
Super-Royal - - - - -	27 - 19	68·6 - 48·3
Royal - - - - -	24 - 19	61·0 - 48·3
Medium - - - - -	22 - 17 $\frac{1}{2}$	55·9 - 44·4
Demij - - - - -	20 - 15 $\frac{1}{2}$	50·8 - 39·4
Large post - - - - -	21 - 16 $\frac{1}{2}$	53·3 - 42·5
Small post - - - - -	19 - 15 $\frac{1}{2}$	48·3 - 39·4
Foolscap - - - - -	16 $\frac{1}{2}$ - 13 $\frac{1}{2}$	41·9 - 33·7

NOTE.—These are drawing and writing paper sizes.—printing papers are of different dimensions.

With rags produced by a population of 27 $\frac{1}{2}$ millions of inhabitants in Great Britain and Ireland, and notwithstanding the large quantities of bagging and other descriptions of linen and cotton wrappers, old sails, cordage, and old navy stores, &c., England imports from foreign countries a quantity of rags, amounting annually to 8,12 $\frac{1}{2}$ tons, as the following table shows :—

AN ACCOUNT of the Quantity of Old Rags, Old Junk or Ropes, or Old Fishing Nets, fit only for making Paper or Pasteboard, Imported into the United Kingdom in the Year 1850, showing the Countries from which Imported.

Countries from which Imported.	Quantities Imported into the United Kingdom in the Year 1850.
	Tons.
Russia - - - - -	859
Sweden - - - - -	61
Norway - - - - -	101
Denmark - - - - -	206
Prussia - - - - -	27
Germany, viz.—	
Mecklenburg Schwerin - - - - -	78
Hanover - - - - -	23
Hanseatic Towns - - - - -	4,449
Channel Islands - - - - -	282
Italy :—	
Duchy of Tuscany - - - - -	1,352
Papal Territories - - - - -	305
Naples and Sicily - - - - -	41
Austrian Territories - - - - -	43
Malta - - - - -	91
Egypt - - - - -	23
British Possessions in South Africa - - - - -	27
British Possessions in East Indies - - - - -	29
British Colonies in North America - - - - -	25
United States of America - - - - -	32
Brazil - - - - -	18
Other Ports - - - - -	52
	8,124

The waste* of the Manchester cotton-mills, and that of the spinning-mills in England, Scotland, and Ireland, produces enormous quantities of material, which is now skilfully applied to paper-making, and, when mixed with rope, bagging, &c., produces strong and good paper for most purposes.

Of the large number of paper-makers in Great Britain and Ireland, a few only have exhibited, namely:—Mr. JOYNSON, of St. Mary Cray, Kent, who exhibited a large assortment of blue wove, blue laid, large bank post, cream laid post, blue laid post, and cream laid foolscaps; the $5\frac{1}{2}$ lbs. thin large bank post, in imitation of the French *pelure*, was not equal to that exhibited by the French manufacturers, although a nearer approach than any yet made in England of that weight. The post and other papers were all of high qualities, fully maintaining Mr. Joynton's reputation as a first-rate manufacturer. Mr. DEWDNEY, of Collumpton, specimens of excellent cream laid writing-papers, and also some unchangeable blue papers of superior manufacture for the use of starch-makers. Mr. SAUNDERS, of Dartford, strong parchment paper, for printing shares, and other purposes where great strength and tenacity are required; plain and coloured bank-note papers, of strong texture, with a variety of water-marks of elaborate and complicated designs; white and coloured safety papers, for printing bankers' cheques, letters of credit, &c., detecting the removal of writing by chemical re-agents, and some specimens of a new method of making papers with water-marks, giving gradations of light and shade: the whole of these papers were of excellent qualities and make. Messrs. COWAN and Co., of Edinburgh, a variety of printing, writing, note, and letter papers. Mr. WILLIAM WILDES, of Snodland, Rochester, some specimens of writing-papers, with wreaths of flowers in the water-mark. Messrs. BANCKS BROTHERS, Chesham, patent writing-papers with ornamented water-mark. Mr. CHARLES VENABLES, Clifden and Soho Mills, specimens of well-made and fine quality plate, lithographic, and printing-papers. Mr. GEORGE VENABLES, strong and good wrapping-papers. Mr. EDWARD SMITH, Gateshead, strong brown paper, manufactured by Messrs. Thomas Gallon and Co. Mr. LAMB, of Newcastle, pottery tissues, of excellent quality. Mr. FOURDRINIER also had some pottery tissues, of good quality, in Class VI. Mr. ALFRED HAMER, of Horsforth, Leeds, &c., press papers, for pressing woollen cloths; and brown papers, rolled and glazed, of good qualities. Messrs. HASTINGS and MELLER, brown paper, glazed and unglazed; and press papers, of good qualities. Messrs. WHITELEY and SONS produced some fine specimens of press papers. Messrs. VENABLES, WILSON, and TYLER, of Queenhithe, and Messrs. SPICER, of Bridge Street, wholesale stationers, enabled the Jury to ascertain the state of the paper trade in this country by the ample and varied specimens each of those houses have submitted

* The quantity of cotton-wool imported in 1845 was seven hundred and twenty millions and a half pounds weight; above one thousand tons of raw cotton are required for daily consumption. In 1850, one million eight hundred and twenty-two thousand hundredweight of flax was imported. Linen and flax are spun to the value of ten millions sterling annually.—*Vide* Sharp's "New Gazetteer," edit. 1852, p. 976. Chevalier Clausen's discovery of flax-cotton, which promises to extend the growth and manufacture of flax, cannot fail greatly to increase the best description of raw material for paper-making. In 1775 a description was given by Lady Moira, and published in the Transactions of the Society of Arts in 1783, of a new method of reducing flax to a fine fibre by means of an alkaline solution: the specimens were retained by the Society.

to public inspection in Class XVII. Messrs. DE LA RUE and Co., as paper-finishers, displayed every description of the best writing-papers produced in England, thus affording the means for judging of the high state of *finish* which this important branch of manufacture has reached in Great Britain.

Writing-Papers in Packets.

Immediately after the introduction of the penny postage* in this country there was an immense increase in the consumption of letter and note paper, and a total change in the sizes was required. Until 1839, 4to letter-paper was put up only in half reams, and retailed in loose quires or single sheets, at prices varying from 6*d.* to 1*s.* per quire. Very superior letter and note papers are now sold in neat and convenient packets at from 1*s.* to 2*s.* 6*d.* per five quires. The patent cutting-machine of the late Mr. George Wilson proved a powerful auxiliary in enlarging the sphere of this branch of the paper-trade, by accelerating one of its simplest operations, cutting in letter and note size. Without its aid it would have been scarcely possible, by hand labour alone, to supply the daily increasing demands of society for note papers since the introduction of the cheap postage. This is one of the innumerable commonplace instances which show that the full importance of machinery in the commercial progress of the community is not duly appreciated, unless time and quantity are taken into the estimate as well as difficulty. It is to Messrs. De La Rue that the new sizes and improved mode of putting up paper in convenient forms is due. The quantity and variety exhibited by them and others are evidence of the encouragement given by the public to this ornamental mode of packeting letter and note papers, for each size of which envelopes are made to suit.

The following exhibitors also displayed writing-papers in packets, viz. :—

MESSRS. DOBBS and Co., London; Messrs. COWAN, of Edinburgh; Messrs. SPICER BROTHERS; and Messrs. VENABLES, WILSON, and TYLER.

* PENNY POSTAGE.—The following is an estimate of the number of chargeable letters delivered in the United Kingdom in each year from 1839 to 1851 :—

Years	Number of Letters.	Annual Increase.	
		Number of Letters.	Percentage reckoned on the Number for 1839.
1839	76,000,000†	—	—
1840	169,000,000	93,000,000	123 per cent.
1841	196,500,000	27,500,000	36 "
1842	208,500,000	12,000,000	16 "
1843	220,500,000	12,000,000	16 "
1844	242,000,000	21,500,000	28 "
1845	271,500,000	29,500,000	39 "
1846	299,500,000	28,000,000	37 "
1847	322,000,000	22,500,000	30 "
1848	329,000,000	7,000,000	9 "
1849	337,500,000	8,500,000	11 "
1850	347,000,000	9,500,000	12½ "
1851	360,500,000	13,500,000	18 "

† The estimate for 1839 is founded on the ascertained number of letters for one week in the month of November, and, strictly speaking, it is for the year ending December 5, at which time 4*d.* was made the maximum rate. The estimate for each subsequent year is founded on the ascertained number of letters for one week in each calendar month.—(Vide Return to the House of Commons, No. 574, 1851.)

Foreign manufacturers have adopted the mode of making up letter and note paper in ornamental packets, and they have exhibited a variety of good specimens, among which were—

France.—M. MARION, M. BERTOU, and M. VALANT, of Paris.

Belgium.—MM. GODIN and SON, and M. TARDIF, of Brussels.

Zollverein States.—MM. SCHAEFFER, OTTO, and SCHEIBE, of Berlin; M. C. A. KOCH, of Gladbach, near Mulheim, on the Rhine; MM. HOESCH and SON, Duren; M. L. SCHUELL, of Duren; M. PIETTE, of Dillingen.

Grand Duchy of Wurtemberg.—M. SCHAEUFFELEN, Heilbron.

Russia.—MM. VARGOUNIN BROTHERS, St. Petersburg.

PAPER-MAKING—FRANCE.

France, besides importing yearly from America 125,000,000 lbs. of cotton, and ultimately converting a large portion of this into rags, the export of which commodity is forbidden by the French law, is also in a favourable position with regard to other raw materials, such as hemp and linen rags. Unfortunately the introduction of strong alkalies, used in washing in large towns, greatly deteriorates, there and elsewhere, the materials for paper-making.

The northern countries, where hemp and flax are abundant, are in general favourably situated with regard to the quality of the rags.

There was in the Exhibition a species of paper made in the Sandwich Islands, from vegetable substances, retaining the original strength and flexibility of the raw material.

Every fibrous plant is capable of being converted into paper; many attempts have been made in this and other countries to use the bark of trees, straw, and similar substances for that purpose, but the great waste and expense in converting these substances into pulp have hitherto precluded their use in large quantities. Should, however, rags become so scarce as greatly to enhance their price, recourse might be had to the use of raw materials, such as the dwarf banana, the dwarf palm, the aloe, white wood, and even straw. But it would still be necessary to mix these materials with rags to lessen the transparent appearance of paper made entirely of such substances, as was evident in that exhibited by M. GRATIOT, made at the Essonnes paper-mill.

At the French Exhibitions of 1839 and 1844 there were specimens of paper made with the leaves of the banana-tree and similar plants, but the experiments then made showed great waste in converting them into paper. With a view of reducing the cost of carriage, by freeing the substances from foreign matter, M. Rocques established powerful works at Havannah, to wash and convert them into pulp for the European markets; but even in this state the absolute necessity of strong bleaching caused a waste of more than one-third of the original weight.

M. FLECHEY exhibited in the Algiers department of the Great Exhibition specimens of paper made of the dwarf palm (*Chamaerops humilis*), which abounds in that country, and of which he states that four millions of hundredweights could be obtained every year, at a trifling cost, by causing it to be gathered by women and children, so that it might be had for two francs the two hundred pounds; and he contends that if beaten into half stuff whilst in its green state, it would yield 36 per

cent. of its weight, and dry, 50 per cent., and that two hours beating would be sufficient to render this half stuff fit for making fine paper.

M. Didot states that there are 200 machines in France, producing each 700 kilogrammes per day, or 195 tons each per year, making a total of thirty-nine thousand tons, and 250 vats, producing over two thousand tons more per year, being a gross amount of forty-one thousand tons.*

The first paper-machine was established in France in 1815.

The following is a list of the French paper-makers who have exhibited, viz :—
 MM. LACROIX, of Angoulême and Paris, superior writing-paper. MM. ODENT, SON, and Co., Courtaline (Seine-et-Marne), machine and vat-made writing and printing papers. MM. BLANCHET BROTHERS, and KLEBER, Rives (Isère), white and tinted writing and printing papers. MM. CALLAUD-BELISLE and Co., Angoulême, writing papers for ledgers, post paper, drawing and tracing papers; the latter of excellent quality. M. G. DE SERLAY, Gueurs, Seine Inferieure, various sorts of paper. M. E. DOUMERC, Jouy, St. Morin (Seine-et-Marne), printing, lithographic, and plate papers, drawing and writing papers, strong paper for vouchers and bank-notes. M. A. GRATIOT, of the Essonnes paper-mills, tissue paper made from the banana-tree; writing-papers. THE JOINT STOCK COMPANY OF THE SOUCHE, writing, printing, staining, filtering, and imitation India papers: the filtering-paper of superior quality. MM. MONTGOLFIER, of Annonay and Paris, drawing, writing, and printing papers, animal papers, &c. MM. OBRY, BERNARD, and Co., Prouzel, Amiens, drawing, writing, printing, and other papers. M. FLECHEY, of Algiers, a specimen of paper made from the dwarf palm-tree.

TABLES showing the IMPORT and EXPORT of PAPER, RAGS, &c., in FRANCE.

EXPORTATION 1849.		IMPORTATION 1849.	
RAGS FOR PAPER.		RAGS FOR PAPER.	
	Kilos.		Kilos.
Algiers - - - - -	465	Belgium - - - - -	29,208
United States - - - - -	-	England - - - - -	18,378
Goadaloupe - - - - -	300	Sicily, Kingdom of - - - - -	22,655
Other Countries - - - - -	130	Tuscany - - - - -	24,714
	—	Switzerland - - - - -	205,809
	895	Turkey - - - - -	30,414
		Algiers - - - - -	421,830
		Other Countries - - - - -	57,233
			<u>810,301</u>

* These data are approximate. Paper-hangings and brown paper are included. A paper-machine occupies about sixty persons; one vat about ten.

IMPORTATION 1849.

PAPER.

	Kilos.		Kilos.
White or ruled, for music :—		Envelopes, coloured :—	
Belgium - - - - -	85	Zollverein - - - - -	848
England - - - - -	3,889	Hanseatic Towns - - - - -	-
Spain - - - - -	804	Sardinia - - - - -	212
Sardinia - - - - -	28	Philippine Isles - - - - -	530
Egypt - - - - -	-	Other Countries - - - - -	253
Other Countries - - - - -	92		<u>1,843</u>
	<u>4,898</u>		
Coloured, in reams or quires, for binding :—		Painted, in rolls for hangings :—	
Zollverein - - - - -	1,199	Netherlands - - - - -	-
Netherlands - - - - -	-	Hanseatic Towns - - - - -	-
Belgium - - - - -	70	England - - - - -	5
England - - - - -	13	Other Countries - - - - -	120
	<u>1,282</u>		<u>125</u>
		Silk Paper, India Paper, &c., &c. :—	
		England - - - - -	4,866
		China - - - - -	976
		Other Countries - - - - -	241
			<u>6,083</u>

EXPORT OF PAPER FROM FRANCE IN 1849.

PAPER.

	Kilos.	White or ruled for Music :—cont.	Kilos.
White, or ruled for music :—		Cuba and Porto Rico - - - - -	48,111
Russia, M. N. - - - - -	26,906	St. Thomas's - - - - -	25,746
" M. B. - - - - -	24,657	Brazil - - - - -	300,279
Denmark - - - - -	9,019	Mexico - - - - -	356,816
Zollverein - - - - -	18,317	Venezuela - - - - -	16,111
Netherlands - - - - -	10,622	New Grenada - - - - -	15,972
Belgium - - - - -	32,580	Peru - - - - -	132,844
Hanseatic Towns - - - - -	111,332	Chili - - - - -	204,516
England - - - - -	200,885	River Plate - - - - -	84,663
Portugal - - - - -	46,752	Uruguay - - - - -	13,719
Austria - - - - -	10,814	Guadaloupe - - - - -	23,183
Sicily - - - - -	28,559	Martinique - - - - -	51,642
Spain - - - - -	43,070	Réunion, Isle - - - - -	20,753
Sardinia - - - - -	67,051	Sénégal - - - - -	11,526
Tuscany - - - - -	17,167	Other countries - - - - -	23,290
Switzerland - - - - -	91,891		<u>2,848,853</u>
Greece - - - - -	58,676		
Turkey - - - - -	110,531	Coloured, in reams or quires, for binding, &c. :—	
Egypt - - - - -	84,701	Russia, M. B. - - - - -	5,209
Barbary - - - - -	23,432	Zollverein - - - - -	2,350
Algiers - - - - -	165,900	Belgium - - - - -	6,375
Africa, West Coast - - - - -	8,497	England - - - - -	4,703
Mauritius - - - - -	11,058	Portugal - - - - -	1,030
India - - - - -	136,540	Spain - - - - -	3,600
Batavia, &c. - - - - -	14,800		
United States, O. A. - - - - -	139,773		
" O. P. - - - - -	12,096		
Hayti - - - - -	14,047		

	France.		France.
Sweden - - - - -	13,270	Coast of Guinea - - - - -	1,400
Norway - - - - -	27,327	Morocco - - - - -	1,320
Denmark - - - - -	38,751	Singapore - - - - -	10,250
Prussia - - - - -	12,374	United States - - - - -	19,950
Mecklenburg-Schwerin - - - - -	2,932	Mexico - - - - -	12,200
Hamburg - - - - -	163,452	Guatemala - - - - -	2,379
Bremen - - - - -	3,535	Cuba - - - - -	3,350
Lubeck - - - - -	9,673	Brazil - - - - -	146,415
Grand Duchy of Luxemburg - - - - -	310	River Plate - - - - -	1,820
Netherlands - - - - -	298,829	Chili - - - - -	19,725
England - - - - -	95,904		
France - - - - -	12,781		900,997
Portugal - - - - -	500		
Turkey - - - - -	2,650		

STATISTICS relative to the

Description of MANUFACTURES.	Provinces.	No. of Manufacturers.	Number of Work people of both Sexes, with their Ages.																	
			Above 16 Years.		Children.						Number of each Sex.			Total.	Under 10 Cents.		From 10 Cents. to 1 Franc.		From 1 Fr. to 1 Fr. 50 Cents.	
Men.	Women.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Male.	Female.	Men.	Women.	Men.	Women.	Men.	Women.					
Paper Mills	Antwerp -	1	23	11	-	-	4	2	-	-	27	13	40	-	-	10	11	8	-	
	Brabant -	48	481	420	5	1	37	17	133	54	656	492	1148	4	5	76	413	282	3	
	East Flanders	9	76	22	-	-	12	-	16	2	104	24	128	-	-	2	14	57	8	
	Hainaut -	3	16	1	-	-	3	2	5	3	24	6	30	-	-	2	-	14	1	
	Liege - -	9	151	277	3	5	3	12	11	54	168	348	516	-	14	16	292	68	21	
	Limbourg -	1	12	-	-	-	-	-	-	-	12	-	12	-	-	9	-	3	-	
	Luxembourg	3	12	7	-	-	-	-	-	-	12	7	19	2	5	-	2	10	-	
Total for the Kingdom		74	771	738	8	6	59	33	165	113	1003	890	1893	6	24	115	732	442	33	
Paper and Pasteboard	Hainaut -	2	18	3	-	-	-	-	5	2	23	5	28	-	-	3	3	8	-	
	Namur -	4	78	141	-	-	-	-	6	22	84	163	247	-	-	6	133	45	8	
The whole Kingdom -		6	96	144	-	-	-	-	11	24	107	168	275	-	-	9	136	53	8	

MM. GODIN and SON, of Huy, Liège, displayed an extensive collection of every description of drawing, writing, printing, and packing papers; some drawing-papers in long lengths, well made, and hard-sized. They were the only paper manufacturers from Belgium who exhibited. From the Netherlands, MM. HONIG, of Zaandijk, exhibited double elephant paper, of excellent quality, and MM. VAN GELDER and SONS, of Wormerveer, some specimens of excellent purple and white paper, white inside and purple outside, machine made, for the use of sugar refiners.

Rome.—M. MILJANI exhibited specimens of drawing and plate papers, of excellent quality.

The importations of rags and other material for paper-making into Belgium, in 1849, amounted to only fourteen tons and a half.

In 1849 Belgium imported paper from the following countries to the amount of 69,343 francs (2,774*l.*):—

	Francs.
Prussia - - - - -	16,929
Grand Duchy of Luxembourg - - - - -	1,437
Netherlands - - - - -	3,136
England - - - - -	8,681
France - - - - -	37,483
Other Countries - - - - -	977
Total - - - - -	69,343

Manufacture of Paper in Belgium.

Daily Wages of the Workpeople.														Steam Engines.		Horse Mills.		Mills.					
Adults.														Children.									
From 1 Fr. to 2 Cts.		From 2 Fr. to 3 Fr. 50 Cts.		From 3 Fr. to 4 Fr.		From 4 Fr. to 5 Fr.		Above 5 Fr.		Total.	Under 50 Cts.		From 50 Cts. to 1 Fr.		Above 1 Fr.		Number.	Horse Power.	Number.	Horse employed.	Water.	Wind.	
Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.		Boys.	Girls.	Boys.	Girls.	Boys.	Girls.							Total.
4	-	1	-	-	-	-	-	-	-	34	4	2	-	-	-	-	6	-	-	-	-	1	-
102	-	9	-	7	-	1	-	-	-	902	115	52	56	20	4	-	247	13	142	-	-	47	-
14	-	2	-	1	-	-	-	-	-	98	21	-	7	2	-	-	30	1	12	2	4	4	7
-	-	-	-	-	-	-	-	-	-	17	5	2	3	3	-	-	13	-	-	-	-	3	-
33	-	10	-	2	-	-	-	-	2	478	13	59	4	12	-	-	88	8	100	-	-	10	-
-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-	-	-	-	1	-
-	-	-	-	-	-	-	-	-	-	19	-	-	-	-	-	-	-	-	-	-	-	2	-
173	-	22	-	10	-	1	-	-	2	1560	158	115	70	37	4	-	384	22	254	2	4	58	7
7	-	-	-	-	-	-	-	-	-	21	5	-	-	2	-	-	7	-	-	-	-	2	-
19	-	5	-	1	-	-	-	2	-	219	1	6	5	16	-	-	28	3	70	-	-	4	-
36	-	5	-	1	-	-	-	2	-	240	6	6	5	18	-	-	35	3	70	-	-	6	-

Denmark.—MM. DREWSEN and SONS, of Silkeborg, Jutland, exhibited specimens of writing-paper, milled in long lengths, stated to be by a new process. The finish is not equal to the highly glazed papers called *satined*, but as *mill-glazed*, the specimens were good.

PAPER-MAKING—THE ZOLLVEREIN STATES.

The manufacture of paper has rapidly increased in the German Zollverein within the last few years. The States not only now produce paper sufficient for their own consumption, but also for exportation. Rags are largely imported from other

countries. The average yearly consumption of rags is said to be four pounds per head of the entire population, as proved by manufacturers who collect their rags within certain districts: this statement seems to be corroborated by its corresponding with the amount of the actual consumption of linen and cotton. The Zollverein, according to the last census, had a population of 29,649,330 souls. In 1850 the weight of rags made into paper in the German Zollverein was between 1,180,000 and 1,190,000 cwt. This shows the great activity in the manufacture of paper in these States. In the Prussian provinces of Silesia, Saxony, Westphalia, the Rhine provinces, and also Brandenburg, both Hesses, the kingdom of Saxony, and many of the other States of the Union, large quantities of paper are produced. There are 794 paper-mills, having 116 paper-machines, which, at an average of 700 kilogrammes of paper per day, gives 36,964 tons per year. It is an important fact that in the Zollverein the finer and better sorts of paper are produced, and part exported, whilst the common paper is imported. The proportion, according to the average of the years 1843 to 1845, and 1846 to 1848, will be best understood from the following Table:—

	Quantity, per Cwt.						Value (Prussian Dollars).			
	Price per Cwt.	Average of 1846-48.		Average of 1843-45.			Average of 1846-48.		Average of 1843-45.	
		Dollars	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Unsize ordinary printing paper	7	-	-	1,447	-	1,589	-	10,129	-	11,123
Gray blotting and packing paper	8	-	1,142	-	1,006	-	9,136	-	8,048	-
All other sorts of paper - -	15	-	-	5,468	-	5,621	-	82,020	-	84,815
Paper-hangings - - -	40	-	-	1,606	-	838	-	64,240	-	53,820
Bookbinders' stationery - -	100	-	-	1,142	-	1,276	-	114,300	-	127,600
Total - -	-	-	-	-	-	-	9,136	270,589	8,048	356,538
Excess of Exports - -							261,453		248,510	

It appears from the above that stationery forms a large portion of the exports, which consists of numerous small articles, such as porte-monnaies and similar goods, for which Berlin and other Zollverein large cities are celebrated. From 1844 to 1847 the annual amount of rags imported exceeded that of the export by nearly 11,000 cwts. In 1848 this excess of import was reduced to 4,500 cwts. In 1849 and 1850 these amounts increased, and in the latter year the imports were 8,386 cwts., and the exports 1,604 cwts., showing an excess of 6,782 cwts. of rags imported more than those exported. The first paper machine was established in Berlin in 1818.

Printing keeps pace with paper-making. The circulation of periodicals is very considerable. In 1840 Prussia alone had more than 300 newspapers and periodicals, and the number has since greatly increased. In Germany the great number of scientific works form an important branch of the book trade. The catalogue of the Leipzig fair of Easter 1851 gives the titles of upwards of 4,000 new books of various descriptions; and that of Michaelmas 1851 about the same number. In 1850, 16,783 cwts. (Zollverein standard) of books were imported, and 24,897 cwts. exported. In Prussia alone there are 24 type-foundries, in which 244 workmen are occupied; in the Zollverein above 50 foundries employing upwards of 600 workmen.

The number of establishments in Prussia for book printing and music is 574, with 1,154 presses and 3,585 workmen. Berlin possesses 53, with 198 presses, and 934 workmen. The whole of the Zollverein, with the exception of Wurtemberg, Brunswick, and Frankfort-on-the-Maine, from which States the official accounts are wanting, has 933 establishments, with 2,085 presses, and 7,062 workmen; so that when the returns of those States are ascertained, not less than 1,000 establishments and 8,000 workmen will be the probable numbers. In 1849 there were in the Prussian dominions,—

	Men.
Establishments for copper, stereoplate printing, and woodcut printing	35, employing 119
Establishments for lithography	414 „ 1,173
Booksellers, print, and music shops	739 „ 885
Old book shops (<i>antiquare</i>)	87 „ unknown.
Circulating libraries	645 „ unknown.

Lithographic printing is much more on the increase than the other branches of printing. Leipsic is the centre of the Zollverein book trade, where booksellers from Germany and other countries assemble twice a-year, at Easter and Michaelmas, to confer with each other and balance their accounts. Berlin is the seat of the Royal Academy of Sciences, with its own printing-office for difficult and learned works; the University, with its many scientific establishments; the Royal Library, the great museum of art; and printing establishments are found there in great numbers. There were, in that city alone, in 1849, 8 type-foundries, with 110 workmen; 53 establishments for printing books and music, with 198 presses, and 934 workmen; 17 establishments for copper, steel-plate, and wood-cut printing, with 64 workmen; 41 lithographic establishments, with 265 workmen; 121 book, print, and music shops, with 141 workmen; 17 dealers in old books; 43 circulating libraries.

The following official Tables, prepared with great care, furnish valuable information :—

LIST of PAPER-MILLS, specifying the Number of VATS and PAPER-MAKERS, together with the number of PERSONS employed in the Year 1846.

STATES OF THE ZOLLVEREIN.	Provinces.	Number of Mills.	Number of Workmen.	Number of Vats.	Number of Paper Machines.
Prussia - - - -	Prussia - - - - -	16	329	20	2
	West Prussia - - - - -	23	116	28	-
	Posen - - - - -	19	85	23	-
	Brandenburg - - - - -	34	930	41	9
	Pomerania - - - - -	17	196	21	5
	Silesia - - - - -	76	893	86	12
	Saxony - - - - -	69	880	84	9
	Westphalia - - - - -	68	1,037	83	16
	Rhine Province - - - - -	72	1,927	117	19
	Total - - - -	394	6,393	503	72
Bavaria - - - -	Upper Bavaria - - - - -	17	309	33	2
	Lower Bavaria - - - - -	10	230	22	2
	Palatinate - - - - -	22	305	-	-
	Upper Palatinate, Ratisbon - - - - -	22	139	26	-
	Upper Franconia - - - - -	22	117	29	-
	Middle Franconia - - - - -	29	339	39	2
	Lower Franconia, Aschaffenburg - - - - -	29	173	58	1
	Suabia and Neuburg - - - - -	25	272	50	4
	Total - - - -	176	1,884	257	11
Saxony - - - -	Dresden - - - - -	10	262	12	2
	Leipzig - - - - -	10	106	8	1
	Zwickau - - - - -	40	316	43	-
	Bautzen - - - - -	6	313	5	3
	Total - - - -	66	997	68	6
Grand Duchy of Hesse -	Starkenburg - - - - -	8	30	9	-
	Upper Hesse - - - - -	13	140	18	1
	Total - - - -	21	170	27	1
Electorate of Hesse - -	- - - -	28	299	39	6
Baden - - - - -	- - - -	32	624	33	14
Nassau - - - - -	- - - -	27	196	30	6
Parts of other States that partake in the Prussian Zollverein.	- - - -	10	99	14	-
Thuringian States - -	- - - -	41	274	53	-
	The accounts from Wurtemberg and Brunswick are wanting.	-	-	-	-
	Total Zollverein, 1846 -	795	10,936	1,024	116

IMPORTS AND EXPORTS OF RAW MATERIALS for PAPER-MAKING in the ZOLLVEREIN in 1850.

STATES OF THE ZOLLVEREIN.	Provinces.	Districts and Manufacturing Places.	Linen, Cotton, and Woollen Rags, Paper-waste.		Fishing Nets, Junk, and Ropes.	
			Import.	Export.	Import.	Export.
Prussia - - -	Prussia - - -	Memel - - - -	Cwt.	Cwt.	Cwt.	Cwt.
		Tilsit - - - -	474	-	1	106
		Schmalleningken - -	591	-	-	-
		Stallupönen - - - -	1,342	-	-	-
		Total - - - -	-	-	-	-
	West Prussia - - -	Dantzig - - - -	-	110	255	-
	Posen - - -	Podzamie - - - -	9	-	-	-
		Pogorzelice - - - -	1,052	-	-	-
	Pomerania - - -	Cavelpass - - - -	-	15	-	-
		Demmin - - - -	-	7	-	-
		Swinemünde - - - -	-	53	-	-
		Stettin - - - -	79	-	-	-
		Tribsee - - - -	-	17	-	-
	Silesia - - -	Görlitz - - - -	68	-	-	-
		Breslau - - - -	2	-	-	-
	Brandenburg - -	Granssee - - - -	2	2	-	-
		Warnow - - - -	-	449	-	-
		Wittenberg - - - -	-	854	-	-
	Saxony - - -	Heiligenstadt - - -	1	-	-	-
	Westphalia - - -	Minden - - - -	92	35	-	-
		Coesfeld - - - -	832	-	2	-
		Warburg - - - -	89	-	-	-
	Rhine Province - -	Aix-la-Chapelle - - -	52	-	-	-
		Total - - - -	4,705	1,542	258	106
Luxemburg - - -	- - -	- - -	2	-	-	-
Bavaria - - -	- - -	Waldenssen - - - -	1	-	-	-
		Waidhaus - - - -	22	-	-	-
		Passau - - - -	4	-	-	-
		Pfronten - - - -	18	-	-	-
		Lindau - - - -	55	-	130	-
		Zweibrück - - - -	1	-	-	-
Saxony - - -	- - -	Total - - - -	101	-	130	-
		Schandaу - - - -	60	-	-	-
		Pirna - - - -	10	-	-	-
		Annaberg - - - -	20	-	-	-
		Eibenstock - - - -	463	-	7	-
		Leipzig - - - -	15	-	-	-
Württemberg - - -	- - -	Total - - - -	568	-	7	-
		Friedrichshafen - - -	59	-	-	-
Baden - - -	- - -	Randegg - - - -	32	-	-	-
		Stühlingen - - - -	251	-	-	-
		Thengen - - - -	483	-	-	-
		Near Rheinfelden - -	152	-	-	-
		Near Schusterinsel - -	1,908	22	-	-
Electorate of Hesse -	- - -	Total - - - -	2,826	22	-	-
		Rinteln - - - -	125	40	-	-
		Total Zollverein, 1850	8,386	1,604	395	106

TABLE showing the IMPORTS AND EXPORTS OF PAPER in the ZOLLVEREIN STATES in 1850.

STATIS OF THE ZOLLVEREIN.	Provinces.	Custom houses.	Uncoated Printing Paper, ordinary White and Coloured Packing Paper.		Sized Paper, Uncoated, Faint, and Coloured.		Grey, Roll- ing, and Packing Paper.		Gold and Silver Paper.		Paper- hangings.		Book- binders' Stationery.		
			Import.	Export.	Import.	Export.	Import.	Export.	Import.	Export.	Import.	Export.	Import.	Export.	
			Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	
Prussia	Prussia	Memel	-	-	170	145	-	-	-	1	-	-	-	3	-
		Tilsit	-	4	17	124	-	-	-	-	-	-	-	4	-
		Schmalleninghen	-	-	-	2	1	-	-	-	-	1	-	-	-
		Stallupönen	-	-	-	153	-	-	-	-	-	-	-	-	-
		Johannisburg	-	4	-	2	-	-	-	-	-	1	-	-	-
	West Prussia	Königsberg	-	-	8	-	9	-	-	-	-	-	-	3	2
		Dantzic	-	3	-	5	-	-	-	-	-	-	-	1	-
	Posen	Thorn	-	54	-	1	-	-	-	-	-	-	-	-	-
		Podamize	-	32	-	1	-	-	-	-	-	-	-	-	-
	Posen	Skalmierzyce	-	43	-	3	-	-	-	-	-	-	-	-	-
		Posen	-	-	1	-	-	-	-	2	-	-	-	-	-
	Pomerania	Cavelpass	-	-	-	-	-	-	-	-	-	-	9	-	4
		Demmin	-	3	807	3	12	-	-	-	-	-	-	-	-
		Stralsund	-	-	41	-	-	-	-	-	-	-	8	-	-
		Swinemünde	-	188	-	43	-	-	6	-	-	10	-	5	-
		Wolgast	-	2	-	-	-	-	-	-	-	-	-	-	-
	Silesia	Stettin	-	1	92	-	-	-	-	-	-	-	-	3	-
		Landenberg	-	-	-	17	-	-	-	-	-	-	-	-	-
		Mittelwalde	-	4	8	1	1	4	-	-	-	-	-	-	-
		Myslowitz	120	108	1	160	317	1	1	1	-	-	-	6	-
		Neustadt	-	4	3	4	2	17	-	-	-	-	-	-	-
		Görlitz	-	1	12	6	23	-	-	-	-	-	-	1	-
		Ratibor	-	94	40	7	169	227	-	10	2	5	1	5	-
		Liebau	-	-	4	-	-	-	-	-	-	-	-	-	-
		Schweidnitz	-	-	-	-	-	-	-	-	-	-	-	1	-
	Brandenburg	Breslau	-	-	7	-	-	-	5	-	-	-	-	5	-
		In the Interior	-	-	-	-	-	-	-	-	-	-	-	1	-
		Berlin	-	60	-	151	-	-	10	-	38	-	95	-	-
		Grünsee	-	10	11	-	318	-	1	-	-	75	-	26	-
		Warnow	-	-	567	-	4,477	38	10	-	413	-	567	-	-
		Wittenberge	-	-	749	5	676	10	46	-	1	2	20	-	-
		Prenzlau	-	-	9	-	26	-	-	-	-	-	-	-	-
	Saxony	Potsdam	-	-	1	-	-	-	-	-	-	-	4	-	-
		Frankfort - on the-Oder.	-	-	-	-	-	-	-	-	-	-	-	-	-
		Heiligenstadt	-	1	12	-	13	-	-	-	-	-	-	-	2
		Salzwedel	-	-	30	1	3	1	-	-	-	-	-	-	-
		Halberstadt	-	1	-	-	-	-	-	-	-	-	-	1	-
	Westphalia	Nordhausen	-	-	1	-	-	-	-	-	1	-	-	-	-
		Halle	-	-	-	4	-	-	-	-	-	-	-	3	-
		Magdeburg	-	16	-	9	-	-	-	-	6	-	-	3	-
		Rosslau	-	-	-	1	-	-	-	-	-	-	-	-	-
		Minden	-	-	2,073	18	10,180	-	-	7	-	738	2	15	-
	Rhine Pro- vince.	Rhine	-	1	33	-	4	-	-	-	-	6	-	7	-
		Telgte	-	-	81	-	5	-	-	-	-	-	2	-	-
		Coesfeld	-	4	23	14	1	37	-	-	-	-	-	-	-
		Lemgo	-	-	72	1	37	-	-	-	-	-	-	1	-
		Warburg	-	-	888	-	35	-	-	-	-	-	-	-	-
		Münster	-	-	-	7	-	-	4	-	-	-	-	1	-
		Paderborn	-	-	-	-	-	-	-	-	-	-	1	-	-
	Carried forward	In the Interior	-	-	-	3	-	-	-	-	-	-	-	-	-
		Aix-la-Chapelle	101	161	40	1,101	17	15	5	-	2	16	30	17	-
		Cranenburg	-	1	-	2	-	1	-	-	-	-	-	-	-
	Carried forward	Emmerich	-	1	87	10	1,348	1	1	-	12	-	2,412	1	240
Carried forward			428	5,592	627	18,957	663	65	29	93	51	3,698	168	916	

Table showing the Imports and Exports of Paper in the Zollverein States in 1850—continued.

STATES OF THE ZOLLVEREIN.	Provinces.	Custom-houses.	United Printing Paper, and only White and coloured Printing Paper.		Sized Paper, Unstained, Fine, and Coloured.		Grey, Blot- ting, and Packing Paper.		Gold and Silver Paper.		Paper- hangings.		Book- binders' Stationery.		
			Import.	Export.	Import.	Export.	Import.	Export.	Import.	Export.	Import.	Export.	Import.	Export.	
Prussia—cont.	-	-	Brought forward	Cwt. 428	Cwt. 5,592	Cwt. 627	Cwt. 18,957	Cwt. 663	Cwt. 65	Cwt. 29	Cwt. 93	Cwt. 51	Cwt. 3,698	Cwt. 168	Cwt. 916
			Kaldenkirchen -	-	6	1	51	-	-	-	-	-	-	-	-
			Malmédy -	-	-	-	63	-	-	-	-	-	-	-	-
			Saarbrücken -	2	1	11	14	2	-	-	-	1	-	4	150
			Treves -	-	-	5	5	-	-	-	-	-	-	2	-
			Coblenz -	-	-	10	-	-	1	-	-	-	-	1	-
			Cologne -	94	-	77	1,273	-	-	9	-	24	-	54	849
			Duisburg -	-	-	1	-	-	-	-	-	-	-	-	-
			Düsseldorf -	3	-	11	-	-	-	-	-	2	-	2	-
			Wesel -	-	-	-	-	1	-	-	-	-	-	3	-
			In the Interior -	-	-	4	-	-	2	-	-	-	-	-	-
			Wassenberg -	-	-	-	-	-	30	-	-	-	-	-	-
			Total -	527	5,599	747	20,363	666	105	41	93	78	3,698	234	1915
Luxemburg	-	-	-	8	104	18	40	-	-	2	-	3	322	11	-
Bavaria -	-	-	Hof -	-	18	1	1	-	-	-	-	-	-	1	-
			Waldsassen -	-	2	-	-	-	-	1	-	-	-	6	-
			Waidhaus -	-	25	-	22	-	1	-	-	-	-	1	-
			Eschlkam -	-	-	2	7	-	1	1	-	-	-	1	2
			Passau -	1	57	2	94	-	-	3	-	-	-	-	1
			Simbach -	9	2	-	1	16	-	2	-	-	-	-	-
			Freilassing -	-	1	-	5	-	-	10	-	-	-	-	-
			Reichenhall -	1	-	1	-	27	-	-	-	-	-	-	2
			Rosenheim -	-	-	2	-	-	-	-	-	-	-	-	-
			Mitterwalde -	-	7	1	46	-	-	-	-	-	20	-	-
			Pfronten -	-	3	1	32	-	-	-	-	-	-	-	2
			Lindau -	-	62	27	20	-	-	11	1	1	-	5	-
			Neuburg-on-the-Main -	-	-	102	11	-	-	-	-	-	-	2	7
			Zweibrück -	-	-	2	2	-	-	-	-	-	-	-	1
			Aschaffenburg -	-	-	8	-	-	-	2	-	-	-	-	-
			Augsburg -	-	-	5	-	-	-	-	-	1	-	1	-
			Bamberg -	-	-	2	-	-	-	-	-	-	-	-	-
			Fürth -	-	-	11	-	-	-	-	-	-	-	-	-
			Kempten -	-	-	4	-	-	-	-	-	-	-	-	-
			Munich -	-	-	67	-	-	-	-	-	9	-	11	-
			Nürnberg -	-	-	13	-	-	-	4	-	1	-	2	-
			Ratisbon -	-	-	5	-	-	-	-	-	-	-	-	-
			Waldmünster -	-	-	-	64	-	-	-	-	-	-	-	-
			Speyer -	-	-	1	-	-	-	-	-	-	-	-	-
			Wormsburg -	-	-	2	-	-	-	3	-	-	-	-	-
			Total -	11	177	259	305	43	-	11	28	12	21	25	20
Saxony -	-	-	Zittau -	136	395	2	4	108	-	-	-	-	13	8	2
			Schandau -	45	-	7	16	420	-	1	-	1	-	1	-
			Pirna -	32	-	6	3	11	-	1	1	-	1	1	-
			Marienberg -	1	-	-	-	3	-	-	-	-	-	-	-
			Annaberg -	16	28	3	2	36	-	1	-	1	-	-	-
			Erbenstock -	31	1	-	3	150	-	-	-	-	-	4	1
			Dresden -	-	-	46	-	-	3	-	16	-	-	19	-
			Chemnitz -	-	-	6	-	-	-	-	-	-	-	1	-
			Plauen -	-	38	-	-	-	-	-	-	-	-	-	-
			Leipzig -	14	-	76	-	-	6	-	9	-	-	26	-
			In the Interior -	-	-	1	-	-	-	-	-	-	-	-	-
			Total -	275	462	147	28	734	-	12	1	27	14	60	3

Table showing the Imports and Exports of Paper in the Zollverein States in 1850—continued.

STATES OF THE ZOLLVEREIN.	Provinces.	Custom-houses.	Unfold Printing Paper, ordinary Writ and General Packings Paper.		Blank Paper, Unlined, Faint, and Coloured.		Grey, Blot- ting, and Packing Paper.		Gold and Silver Paper.		Paper- hangings.		Book- binders' Stationery.	
			Import.	Export.	Import.	Export.	Import.	Export.	Import.	Export.	Import.	Export.	Import.	Export.
Württemberg	-	-	Friedrichshafen	Cwt. 1	Cwt. 32	Cwt. 8	Cwt. 164	Cwt. 1	Cwt. 2	Cwt. 21	Cwt. 3	Cwt. 8	Cwt. 1	Cwt. 23
			Heilbronn	-	-	-	-	-	-	-	-	-	-	-
			Canstadt	-	-	1	-	-	-	-	-	-	-	-
			Stuttgart	-	-	18	-	-	-	-	3	-	9	-
			Ulm	-	-	10	-	-	-	-	-	-	6	-
			Total	1	32	37	164	1	2	21	3	8	17	23
Baden	-	-	Ludwigshafen	-	25	-	49	-	-	-	-	1	-	9
			Constance	-	-	5	4	-	3	-	-	27	-	-
			Randegg	34	2	5	40	5	-	-	-	2	1	31
			Stühlingen	-	-	2	20	-	-	-	-	2	3	29
			Near Rheinfelden	159	-	8	80	1	-	2	-	2	-	48
			Near Schuster- insel.	119	160	20	469	3	11	5	-	52	2	89
			Old Breisach	12	-	1	-	-	-	-	-	-	-	-
			Kehl	3	-	37	149	6	1	1	1	2	11	9
			New Freistett	-	-	2	-	-	-	-	1	-	1	-
			Heidelberg	-	-	2	-	-	-	-	-	-	-	-
			Manheim	-	-	15	-	-	-	-	3	-	7	-
			Carlsruhe	-	-	9	-	-	1	-	1	-	3	-
			Lahr	-	-	7	-	-	2	-	-	-	8	-
			Freiburg	-	-	5	-	-	-	-	-	-	-	-
			Thiengen	2	-	-	8	-	-	-	-	-	-	3
			Total	329	187	118	813	16	14	4	8	6	98	218
Electorate of Hesse.	-	-	Cassel	167	346	17	838	5	275	-	3	111	3	168
			Carlsruhe	-	-	1	108	-	-	-	3	-	-	-
			Witzenhausen	-	69	-	27	-	-	-	-	-	-	10
			Kinteln	2	518	3	25	-	100	-	1	-	1	-
			Hannau	-	-	1	-	-	-	-	-	-	-	-
			Total	169	933	22	998	5	375	-	4	111	4	118
Grand Duchy of Hesse.	-	-	Mayence	-	-	12	-	-	-	-	4	-	4	-
			Offenbach	-	-	2	-	-	-	-	1	-	2	-
			Total	-	-	14	-	-	-	-	5	-	6	-
Thuringian States.	-	-	Saxe-Altenburg	-	-	1	-	-	1	-	-	-	-	-
			Schwarzburg- Rudolstadt.	-	-	1	-	-	-	-	-	-	-	-
			Total	-	-	2	-	-	1	-	-	-	-	-
Brunswick	-	-	Branswick	43	203	12	303	-	95	1	6	102	15	146
			Wolfenbüttel	79	-	164	-	147	-	-	-	-	-	-
			Holzminde	2	475	3	1	42	213	-	-	-	2	1
			Total	124	678	201	304	189	308	1	6	102	17	147
Nassau	-	-	Biedrich	-	-	1	-	-	-	-	1	-	1	-
Frankfort-on- the-Maine.	-	-	-	16	-	219	-	-	2	-	7	-	40	-
			Total Zollverein, 1850	1,460	8,172	1,785	23,021	1,654	795	73	122	152	4,374	451

TABLE showing the Weight of BOOKS Imported into, and Exported from, the ZOLLVEREIN STATES in 1850.

STATES OF THE ZOLLVEREIN.	Provinces.	Custom-houses.	Books Printed, Bound, and not Bound, Maps, and Prints.	
			Exported.	Imported.
Prussia - -	Prussia - -	Pillau - - -	Cwt.	Cwt.
		Memel - - -	-	6
		Tilsit - - -	24	7
		Stallupönen - - -	6	87
		Johannisburg - - -	17	3
		Königsberg - - -	37	2
	West Prussia - -	- - -	3	24
		Dantzic - - -	-	31
		Thorn - - -	28	8
	Posen - - -	Elbing - - -	-	2
		Podzamize - - -	34	-
		Skalmierzyce - - -	-	4
		Szrakowo - - -	-	1
		Bromberg - - -	-	1
		Posen - - -	-	16
	Pomerania - -	In the Interior - - -	-	2
		Kolbergermünde - - -	-	1
		Demmin - - -	20	15
		Greifswald - - -	-	8
		Stolpenmünde - - -	-	1
		Stralsund - - -	29	3
		Swinemünde - - -	1,342	1
		Tribsee - - -	-	4
	Silesia - - -	Stettin - - -	-	216
		Landsberg - - -	12	1
		Liebau - - -	1	6
		Mittelwalde - - -	1	48
		Myslowitz - - -	1,131	124
		Nenstadt - - -	-	6
		Ratibor - - -	286	35
		Breslau - - -	-	322
		Glogau - - -	-	3
		In the Interior - - -	-	1
	Brandenburg - -	Graussee - - -	159	127
		Warnow - - -	6,411	3
		Wittenberge - - -	19	302
		Berlin - - -	-	1,164
		Prenzlau - - -	-	4
		Potsdam - - -	-	8
		In the Interior - - -	-	7
		Frankfort-on - the - Oder.	-	4
	Saxony - - -	Heiligenstadt - - -	69	76
		Salzweil - - -	1	3
		Halberstadt - - -	-	4
		Nordhausen - - -	-	32
		Halle - - -	-	22
		Magdeburg - - -	-	181
		Naumburg - - -	-	1
		Rosslau - - -	-	5
	Westphalia - -	In the Interior - - -	-	6
		Minden - - -	558	96
		Rheine - - -	-	4
		Telgte - - -	10	7
		Coesfeld - - -	2	3
		Lemgo - - -	-	24
		Warburg - - -	1	4
		Münster - - -	11	19
		In the Interior - - -	-	7
Carried forward -			10,612	3,102

Table showing the Weight of Books Imported into, and Exported from, the Zollverein States in 1850—continued.

STATES OF THE ZOLLVEREIN.	Provinces.	Custom-houses.	Books Printed, Bound, and not Bound, Maps and Prints.	
			Exported.	Imported.
Prussia - -	Rhinic Provinces	Brought forward	Cwt.	Cwt.
		Aix-la-Chapelle - -	10,612	3,102
		Cranenburg - -	210	856
		Emmerich - -	31	7
		Kaldenkirchen - -	1,395	75
		Malmédy - -	12	4
		Malmédy - -	-	12
		Saarbrücken - -	6	60
		Wassenberg - -	-	1
		Treves - -	1	6
		Coblenz - -	-	4
		Cologne - -	2,399	2,085
		Duisburg - -	-	9
		Düsseldorf - -	-	-
		Neuss - -	-	-
		Wesel - -	-	9
		Uerdingen - -	-	2
		In the Interior - -	-	14
		Total - -	14,666	6,246
Luxemburg - -	- -	- -	2	118
Bavaria - -	- -	Hof - - - -	1	2
		Waldsassen - -	2	1
		Waidhaus - -	28	-
		Waldmünchen - -	13	-
		Eschlkam - -	37	4
		Passau - -	367	55
		Limbach - -	28	-
		Freilassing - -	218	109
		Reichenhall - -	8	1
		Rosenheim - -	4	21
		Mitterwalde - -	282	48
		Pfronten - -	23	14
		Lindau - -	565	737
		Neuburg - ou - the - Main, - -	28	8
		Zweibrück - -	5	5
		In the Interior - -	-	273
		Total - -	1,607	1,278
Saxony - -	- -	Zittau - - - -	16	3
		Schandau - - - -	233	36
		Pirna - - - -	6	246
		Marienberg - - - -	1	5
		Eibenstock - - - -	34	6
		Bautzen - - - -	-	1
		Dresden - - - -	-	51
		Leipzig - - - -	-	5,633
		In the Interior - -	-	1
		Total - -	290	5,982
Württemberg - -	- -	Friedrichshafen - -	434	249
		Stuttgart - - - -	-	57
		Ulm - - - -	-	63
		Total - -	434	369

Table showing the Weight of Books Imported into, and Exported from, the Zollverein States in 1850—continued.

STATES OF THE ZOLLVEREIN,	Provinces.	Custom-houses.	Books Printed, Bound, and not Bound, Maps, and Prints.	
			Exported.	Imported.
Baden - -	- -	Ludwigshafen - -	Cwt. 8	Cwt. 15
		Constance - - -	4	18
		Rondegg - - -	486	263
		Stühlingen - - -	42	85
		Thiengen - - -	7	21
		Near Rheinfelden -	140	269
		Near Schusterinsel -	1,637	546
		Old Breisach - - -	-	1
		Kehl - - -	644	222
		New Freistadt - - -	-	11
		Heidelberg - - -	-	9
		Mannheim - - -	-	64
		Carlsruhe - - -	-	19
		Lahr - - -	-	1
		Freiburg - - -	-	9
Total - -		2,968	1,553	
Electorate of Hesse.	- -	Cassel - - -	438	153
		Carlsbaden - - -	-	8
		Witzenhausen - - -	7	1
		Rüdteln - - -	5	6
		Hannu - - -	-	1
		Marburg - - -	-	1
Total - -		450	170	
Grand Duchy of Hesse.	- -	Mayence - - -	-	34
		Offenbach - - -	-	19
		Giessen - - -	-	1
		Total - -	-	54
Thuringia - -	- -	Prussian - - -	-	7
		Hessian - - -	-	-
		Saxe Weimar - - -	-	6
		Saxe Meiningen - -	-	5
		Saxe-Altenburg - -	-	1
		Saxe Coburg - - -	-	66
		Saxe Gotha - - -	-	6
		Schwarzburg, Rudol- stadt.	-	1
Total - -		-	92	
Brunswick - -	- -	Brunswick - - -	105	533
		Wolfenbittel - - -	4	16
		Holzmindeu - - -	-	16
Total - -		109	565	
Nassau - -	- -	Rieberich - - -	-	42
Frankfort - ou - the-Maine.	- -	- -	-	151
Total Zollverein, 1850			20,496	16,620

TABLE showing the Number of TYPE-FOUNDRIES, &c., in the ZOLLVEREIN STATES in 1846.

STATES OF THE ZOLLVEREIN.	Provinces and Districts.	Type-Foundries.		Establishments for Printing Books and Music.		
		Number of Foundries.	Number of Workmen.	Number of Establish- ments.	Number of Presses.	Number of Workmen.
Prussia - - - -	Prussia - - - - -	1	4	28	52	158
	West Prussia - - - -	-	-	25	38	141
	Posen - - - - -	-	-	24	43	158
	Brandenburg - - - -	13	168	98	243	889
	Pomerania - - - - -	-	-	31	56	129
	Silesia - - - - -	2	28	89	150	541
	Saxony - - - - -	3	16	91	200	627
	Westphalia - - - - -	-	-	58	109	270
	Rhine - - - - -	5	28	130	263	672
	Total - - - - -	24	244	574	1,154	3,865
Bavaria - - - -	Upper Bavaria - - - -	3	47	17	40	205
	Lower Bavaria - - - -	-	-	7	16	46
	Palatinate - - - - -	-	-	15	23	48
	Upper Palatinate, Ratisbon	1	3	13	29	98
	Upper Franconia - - - -	-	-	11	23	67
	Middle Franconia - - - -	2	9	21	36	128
	Lower Franconia, Aschaf- senburg.	1	1	14	26	71
	Suabia, Neuburg - - - -	1	5	28	81	202
	Total - - - - -	8	65	126	274	865
Saxony - - - -	Dresden - - - - -	2	19	14	40	227
	Leipzig - - - - -	10	193	47	199	1,227
	Zwickau - - - - -	-	-	20	40	124
	Bautzen - - - - -	-	-	11	23	68
	Total - - - - -	12	212	92	302	1,666
Electorate of Hesse - -	- - - - -	1	4	23	49	113
Haden - - - - -	- - - - -	-	-	46	102	314
Grand Duchy of Hesse -	- - - - -	4	46	40	91	313
Nassau - - - - -	- - - - -	-	-	11	17	39
Thuringian States - -	- - - - -	-	-	9	24	100
Parts of other States belonging to the Union.	- - - - -	1	1	12	22	67
	There are no accounts from Wurtemberg, Brunswick, and Frankfurt-on-the-Main					
	Total Zollverein, 1846 -	50	572	933	2,035	7,062

The Jury with pleasure acknowledge their obligations to Professor Dieterici, Chief of the Bureau of Statistics at Berlin, for the valuable Statistics of the Zollverein.

The following is a list of paper-makers from the Zollverein who exhibited at the Great Exhibition.

MM. EBART BROTHERS, Berlin.—Excellent writing and printing papers; bank-note paper, with superior water-mark; glazing-boards of good quality; and carton-pierre, for roofing.

M. WUTTIG, of Pulverkrug, Frankfort-on-the-Oder.—Tinted printing-papers, of ordinary quality.

M. C. A. KOCH, Gladbach.—Samples of excellent plate, writing, and printing papers; good colour, and well sized.

MM. HOESCH and SON, Duren.—Specimens of writing and printing papers; well-made coloured post papers, coloured tissues—black and rose colour bright and good.

M. SCHÜLL, of Duren.—Laid writing-papers, and printing-papers of fair quality.

L. PIETTE, of Dillengen.—Writing-papers of excellent qualities and good colour, but rather too soft sized.

M. FISCHER, of Bautzen.—Printing, plate, lithographic, and writing papers, of excellent qualities.

MM. RAUCH BROTHERS, of Wurtemberg.—Writing-papers of superior quality; thin *pelure*, well made and hard sized; veneered paper, blotting on one side, the other sized for writing.

MM. SCHAEUFFELEN, of Heilbronn, displayed a large assortment of well-made and good papers, of every description: thin *pelure*, or thin post writing-paper, of good colour, well sized and clean, the folio ream 11s.; white tissues of good quality at 4s. 3d. or 5s. the ream; coloured tissues, bright tints, 10s. the ream; fine and well-made plate-paper, 8d. per pound; second quality plate 6½d. per pound.

UNITED STATES OF AMERICA.

About the year 1730, a paper-mill was erected in Massachusetts, and, about the same time, another in Pennsylvania; but prior to the American Revolution, the progress in this important branch of manufacture was very slow. It appears, however, that before 1768, Christopher Leffingwell began to make paper at Norwich, in Connecticut, and received a bounty from the treasury of the colony of "two pence the quire on all good writing-paper that he made, and one penny the quire on all printing and common paper." At the end of the first year, in May 1770, he received the bounty for 4,020 quires of writing-paper, and 10,600 quires of printing and coarser paper, after which the bounty was discontinued. Messrs. Watson and Ledyard set up a paper-mill in East Hartford, in the same colony; and this one mill, in 1776 and 1777, wholly supplied the press of Hartford, which published weekly above 8,000 newspapers, and also the greater part of the writing-paper used in Connecticut, as well as much of that used by the continental army. Shortly after this, paper-mills sprang up in every part of the country, and continued to increase, with extraordinary rapidity, as did also the number of newspapers and of cheap books. Prior to 1810, the materials for paper-making were procured in the country; but, since that period they have been largely imported from Europe. Nearly all the linen rags are imported, and are in great request in the United States for the purpose of mixing with the domestic cotton rags. It is estimated that the

Italian rags used to contain about 80 per cent. of linen; but it is found that, as cotton for clothing is increasing in all parts of the world, the proportion of linen in the foreign rags is decreasing from 5 to 10 per cent. annually. This fact at first created some alarm; but it is ascertained that raw cotton, where it can be had on the spot for 3d. or 3½d. per pound, answers as a very good substitute for linen. In the United States, the best qualities of writing-paper contain from 30 to 50 per cent. of linen rags. The import duty on rags is 5 per cent. In the year ending June 1850 the quantity of rags imported into the United States was 20,696,875 lbs., of which about one-half, or 10,277,337 lbs. were from Italy; 3,964,815 lbs. from Trieste and other Austrian ports; 1,621,692 from England, Scotland, and Ireland; 14,540,042 from the Hanse Towns; and 1,619,114 from Sicily. The remainder were chiefly from Turkey and Canada.

About 1820 machinery began to be imported into the United States from England and France; but, being found expensive, this was not much encouraged. It was not till about 1830 that Messrs. Phelps and Spafford, of Connecticut, succeeded in manufacturing their machines, which are said to work well. They were much patronised, and they soon greatly enlarged their manufactory. Not long after Messrs. How and Goddard, of Worcester, Massachusetts, began to manufacture in great numbers machines for paper-making. At the present time, these two manufacturers produce nearly all the machines employed in the United States, and have besides begun to export them to South America and Mexico. The machines made by these two firms are those known as the Fourdrinier Machines, with some modifications. A cheaper kind, known as the *Cylinder Machine*, is used extensively for making the coarser and cheaper sorts of paper. These machines are also made in many other parts of the country.

It is only since 1830 that any real impulse has been given to the manufacture of paper in the United States; and this is owing, not more to the introduction of machinery than to the great changes in the mode of manufacture, as well as in the raw materials. Various articles are now extensively used which were not thought of before the introduction of chlorine and other means of cleansing and bleaching. Old junk, rope, hemp, tow, bagging, raw cotton, cotton waste, coloured or filthy rags, &c., are now extensively used even for superior papers. These materials, which were previously only used in the making of coarser papers, have risen 300 per cent. in value; in the United States, they are particularly useful, and consequently in great demand, where no linen is produced for mixing with, and imparting strength to, the cotton materials.

Since the beginning of the present century, the quantity of paper imported into the United States has been constantly decreasing, so that at the present day the proportion of foreign paper is only between two and three per cent. on the whole amount consumed. The paper imported is now almost exclusively of the superior qualities of writing and fancy papers, and is chiefly brought from England and France, each country exporting about equal quantities. Belgium and Italy also contribute a portion. The import duty on all kinds of paper is 30 per cent. *ad valorem*. There is no excise or stamp duty.

The Reporters regret that they have been unable to obtain from the United States the statistics of paper-making, which were so fully collected for the Census of 1850, but which have not yet been published. We are, however,

officially informed, that the number of engines and paper-mills have recently very rapidly increased, especially in the southern and western States. It is estimated that the cost of manufacturing paper at the present day, with all the improvements in machinery, and the increase in the variety of the raw materials, when compared with the old process and materials, is reduced fully 800 per cent. Hence the old-fashioned mode of making hand-made or laid paper is almost entirely abandoned in the United States, there being now only two mills of any note engaged in its manufacture. Even these only make paper of particular sorts, such as bank-note paper, letter, deed, parchment, and such others as require great strength and firmness.

The general diffusion of knowledge, and the consequent demand for newspapers and cheap literature, has rendered the United States the country which, it is said, consumes more paper per head for its population than any other. But the great aim of the manufacturer is rather at cheapness than excellence in quality, though within the last five years improvements in the strength and quality of paper have been made. Recently, the finish of writing and printing papers has been much improved by the introduction of iron and paper calendars.

PAPER-MAKING—AUSTRIA.

The principal mills are in Lombardy, Lower Austria, and Bohemia; there are also some in Venice, and in the Tyrol. Lower Austria contains the most extensive mills. The whole amount of paper produced per annum is now stated to be 650,000 cwts., 250,000 cwts. being common writing, and 60,000 cwts. fine paper; 150,000 cwts. printing, 100,000 cwts. packing, and 60,000 cwts. paper of other descriptions. Steam-power is applied in a few instances, but the mills are chiefly driven by water-power; three-fifths of the whole produce is by vat-mills, and two-fifths by machines. On a population of 38,000,000, it is stated that three pounds of linen rags are produced per head. There are, besides, quantities of old rope, &c., used for paper-making. According to Messrs. Dernier and Mayer d'Anemarr, French Commissioners at the Austrian Exhibition of 1845, the number of paper-machines in that State was 40, the number of vats 940; producing nearly 314,000 quintals (15,011 tons) of paper, valued at 20,500,000 francs, being an average of 6*d.* per lb. The number of persons employed was 12,000, besides rag-sorters.

The number of machines is now 49, and 900 vats. Austria exports paper to the amount of 150,000*l.* per year.

PAPER-MAKING—DENMARK.

In Denmark there are six machines, besides one in Holstein, and 20 vats, producing altogether about 1,312 tons per year. In 1847 Denmark imported about 300 tons of paper from Belgium, France, and other countries. The first paper-mill was established at Frederichsburg, by order of Christian III., and the first machine for making paper was made by Messrs. Donkin, and put up for Mr. J. C. Drewsen, in 1826.

PAPER-MAKING—SWEDEN.

In Sweden there are five paper-mills, employing seven machines and eight vat-mills.

PAPER-MAKING—SPAIN.

In Spain there are 17 machines: 1 in Old Castile, 2 in Valencia, 3 in New Castile, 1 in Estramadura, 2 in Catalonia, 2 in Arragon, 1 in Andalusia, 3 in Guipuscoa, and 1 in Nonane. The principal mills are at Burgos, at Rascafria, near Madrid, at Candelario, near Begor, and at de Copellades, near Barcelona. The machines have been imported from England, France, and Belgium; the first was established near Manzanarès, in La Mancha, by Don Thomas Jordan. There are also 250 vats. The whole produce is 4,741 tons yearly. Of 3,400,000 kilogrammes of paper made in Spain, Catalonia produces 700,000 reams. The weight of rags used in this province is said to be 16,071 tons yearly. One hundred and forty thousand reams of paper were exported from Spain in 1848, to the following countries:—to Cuba, 94,000 reams; to Chili, 16,000 reams; to Porto Rico, 10,000 reams; to other countries, 20,000 reams.

PAPER-MAKING—NETHERLANDS.

The importation of paper in the Netherlands, in 1847, was 219 tons, valued at 17,919 florins, chiefly from Belgium and the Zollverein. The importation of rags 700 lbs. only. The exportation of paper, in the same year, was 148 tons; its principal destination was Java. The exportation of rags was only 1,200 pounds weight.

PAPER-MAKING—SARDINIA. TUSCANY.

In the kingdom of Sardinia there are 12 paper-machines and 60 vats. The first machine was established at Borgo Sesia for Mr. Molino. In 1848 the paper produced, none of which was exported, amounted in value to 6,000,000 florins; whilst in 1846, 1,178 tons of paper was exported from Genoa to Mexico, Spain, and the Brazils.

In Tuscany there are 20 paper-mills, and two Donkin machines, at the mill near Florence. In 1848, the exportation of rags and paper from Leghorn amounted to 30,000 lbs.—about half to England, and the other half to the United States.

PAPER-MAKING—HAMBURGH.

The importation of paper in Hamburgh, in 1848, was of the estimated value of 1,288,000 francs (51,250*l.*).

PAPER-MAKING—SWITZERLAND.

In Switzerland there are 26 machines and 40 vat-mills, producing together 11,607 tons annually. The men's wages are 90 centimes per day (about 8½*d.*), and the women 60 centimes (5½*d.*). No paper is exported.

PAPER-MAKING—SAXONY.

In the kingdom of Saxony, in 1847, there were 66 paper-mills, with 6 machines, employing 992 persons. The exports and imports are trifling.

PAPER-MAKING—ITALY.

In Italy, Lombardo-Venetian Kingdom, six machines are distributed among four mills.

PAPER-MAKING—SICILY.

In the kingdom of the Two Sicilies there are 12 paper-machines. In 1827 M^l Firmin Didot Brothers and Lefevre established the first machine, under a patent of importation, in the Mill of Fibrène (Isola di Sora). The number of persons employed is 1,200. There are about 12 vats, employing 300 persons. The whole produce amounts to 306 tons annually, and paper is exported to Sicily, Rome, Leghorn, Malta, the Ionian Isles, and Greece.

PAPER-MAKING—ROMAN STATES.

In the Roman States there are three machines, at Anatrella, at Fiùme, and in the neighbourhood of Rome.

PAPER-MAKING—TURKEY.

In Turkey there is one mill at Smyrna, and one paper-machine, besides one vat-mill at Constantinople.

PAPER-MAKING—EGYPT.

In Egypt, one vat-mill at Boulac, near Cairo.

PAPER-MAKING—PRICE OF RAGS.

The following is the present price of white rags:—

								Per Ton.	Per 100 kilon.
								£. s. d.	or 2204 lbs.
In America	-	-	-	-	-	-	-	28 2 0	70 fr.
In England	-	-	-	-	-	-	-	25 6 0	63 fr.
In France (in 1840 and following years, it was from 60 fr. to 62 fr.)	-	-	-	-	-	-	-	18 0 0	45 fr.
In the Zollverein	-	-	-	-	-	-	-		
In Austria	-	-	-	-	-	-	-	12 0 0	30 fr.

The principal depôts are at Pesth and at Agram.

In Switzerland	-	-	-	-	-	-	-		
In Belgium	-	-	-	-	-	-	-		
In Holland	-	-	-	-	-	-	-		
In Italy	-	-	-	-	-	-	-		
In Lombardy	-	-	-	-	-	-	-	14 8 0	38 fr.
In the Two Sicilies (until 1850, the price was 24 fr.)	-	-	-	-	-	-	-	12 3 0	31 fr. 50 c.
In the Roman States	-	-	-	-	-	-	-	11 12 0	29 fr.
In Sardinia	-	-	-	-	-	-	-	17 12 0	44 fr.
In Spain	-	-	-	-	-	-	-	17 4 0	43 fr.
In Russia	-	-	-	-	-	-	-		
In Denmark	-	-	-	-	-	-	-	19 5 0	48 fr.
In Sweden	-	-	-	-	-	-	-		

IV. PLAYING-CARDS.

The country in which playing-cards were invented has never been ascertained with any certainty, neither are we acquainted with the precise time of their introduction into Europe. Numerous speculative opinions have been put forth in order to prove that the art of wood-engraving originated from the manufacture of playing-cards, it being supposed that the outlines of the figures or court-cards were cut on wood, and that from this was obtained the first idea of wood-engraving. The most

ancient cards we have seen appear to us to have been stencilled, and this method seems to have been employed for the outline of the figures, as well as for the filling in of the different colours; therefore as stencilling* was probably known long before wood-engraving, we are inclined to believe that the figures were not taken from wood-engravings until at a later period, as an *improvement* on the former mode. Some card-makers of the present day manage stencilling with great skill, and the method is a favourite one as it leaves no impression to show through on the back of the card, a fault sometimes difficult to avoid in white-backed playing-cards, when the outline has been printed on the card-board with a printing-press.

The cards mentioned as the oldest cards we have seen belonged formerly to Mr. Tutet, who has written the following remarks on one of the fly-leaves of the volume in which they are collected:—"The ancient cards† in this volume, with "others, duplicate, and the drawings in the second volume, were purchased by "me out of the collection of Dr. Stukeley; the drawings were produced by the "Doctor on the 9th November 1720 to the Society of Antiquaries, observing that "the cards had been given him by Thomas Rawlinson, Esq., being two pieces of "the cover of an old book, supposed to be "Claudian," printed before 1500; "and then there was a leaf or two of an old edition of Erasmus's *Adages* pasted "between the layers of the cards, which being laid stratum upon stratum, composed "two pasteboards, and made the cover of the book. The Doctor took the pains "to separate the cards, out of which I have chosen a complete pack, and the "better to preserve so singular a curiosity have had it bound, together with the "drawings and some modern French cards. It is observable in the ancient cards "that there are no aces nor queens; but instead of the latter are knights." The marks of the suits are hearts, bells, bones, and acorns, and the court-cards are the king, knight, and knave. The size is 3 inches long by 2½ inches wide. They are very rudely coloured. The figures on the French card above mentioned are the same as those still preferred in this country. It is curious to observe that while the honours of modern French cards have undergone a complete change, those preferred in England retain the costumes and outlines of the oldest French cards, every attempt made to modernize the English court-cards having invariably failed. Some years ago Messrs. De La Rue introduced some improvements, and endeavoured to induce the public to adopt a more modern and defined costume in the court-cards, but they were compelled to abandon the attempt, and return to the old style, after having incurred heavy losses in their endeavours to create a more elegant taste.

* A playing-card stencil is a sheet of strong paper, covered with several layers of oil paint on both sides, and kept for a long time until thoroughly well seasoned, when the form of any figure required is carefully cut out so as to leave sharp edges. The colouring matter, mixed with paste, is brushed over with a large circular brush, and enters into the cut-out parts of the stencil, and thus imparts the design to the card-board placed under it. If this operation is skilfully performed, much better and sharper outlines are obtained than would be generally supposed. Most of the card manufacturers still continue this mode of painting the pips of playing cards, as well as the filling in of the outline of the figures, which are cut on pear-tree wood. The manner of taking the impression of the outline of the figures was done by rubbing, until some few years ago, when Mr. Creswick first employed a press for the purpose.

† Now in the possession of Mr. De La Rue.

In 1392 or 1393 there is the following entry in the accounts of Paupart, treasurer to Charles VI. of France, that monarch having lost his reason in 1392:—"Given to Jacquemin Gringonneur, painter, for three packs of cards, gilt and coloured, fifty-six sols of Paris." The tenor of this passage seems to imply that cards were already known, therefore it is highly improbable that Gringonneur was the inventor, as has been asserted.

It is not known when the manufacture of playing-cards was established in England. As early as 1463 there were card-makers in this country, the importation of playing-cards having been prohibited by Act of Parliament in that year, as injurious to the interests of native manufacturers. No cards of English manufacture of so early a date have, however, been discovered.

The Abbé Rives ascribes the invention of playing-cards to the Spaniards before 1332. Mr. Anstes conjectures that cards were known at the end of the thirteenth century. They appear to have been known to the Italians in 1378, for Covelluzzo states that the game of cards was brought into Viterbo from the country of the Saracens in that year.

In 1397 the labouring classes of Paris were forbidden to play at cards on working days.

Playing-cards appear to have been known in China at an early period. It is said that they were invented in the reign of Leun-ho (1120), and were common in 1131. They are called *che-pae*, which signifies *paper-ticket*. The Chinese cards in the Exhibition measured $2\frac{1}{2}$ inches long by $1\frac{1}{2}$ inch in width.

In the Museum of the Royal Asiatic Society there are three packs of Hindostan cards; they are circular, and measure $2\frac{1}{2}$ inches in diameter, and some smaller, $2\frac{1}{4}$ inches. They appear to be made with canvas. In the Indian department of the Great Exhibition there were also circular cards, which were strongly varnished on both sides. It is supposed that card-making among the Hindostanees is a regular profession, though possibly combined with some other branch of manufacture, as card-painting was combined with wood-engraving in the fifteenth century. The marks of the suits of Hindostanee cards appear to be identified with the customs, manners, and opinions of the people. They coincide with the earliest European cards in having no queen, the two court-cards being a king and his minister or attendant, and the suits being distinguished by the colour as well as by the form of the mark or emblem.

Early in the fifteenth century card-making appears to have become a regular trade in Germany. Nuremberg, Augsburg, and Ulm were the chief towns for the manufacture of playing-cards. Besides supplying the home markets, considerable quantities were exported into Italy, Sicily, and over sea, and bartered for spices and other wares; and at the present day much larger quantities of cards are exported from Germany than from any other country. Their cheapness is, no doubt, the principal cause, for the German cards are generally inferior to those made in England, although some are well made since they have adopted the method of printing the pips and honours, as patented in England in 1832.

At an early period the Netherlands seem to have been famed for the manufacture of cards, for Albert Durer states that he bought half a dozen packs for seven stivers.

From a passage in Ascham's *Toxophilus*, 1545, cards were then about twopence

per pack. This may appear very low to us now, when the duty alone is one shilling per pack for all cards used in England, but cards can be bought for half a crown a dozen in Hamburgh; and if a sufficient demand could be had for export, cards could be produced in this country and sold at these prices.

Edward Darcy obtained a patent for the manufacture of playing-cards at the end of the reign of Queen Elizabeth, who, as well as her sister Mary, was partial to card-playing. The importation of cards was prohibited after the 20th July 1615, during the reign of James I., "as the art of making them was then brought to perfection in this country." The Company of Card-makers was first incorporated by letters patent of Charles I., in 1629. By a proclamation in June 1638, it was ordered that all foreign cards should be sealed in London, and packed in new bindings or covers. A few years later, 1643, the importation of cards was *absolutely* prohibited on the complaint of several poor card-makers, stating "that they were likely to perish by reason of divers merchants bringing cards into the kingdom." This prohibition continues up to the present day, except on payment of a *very high duty* tantamount to the same thing.

During the reign of Charles II. card-making greatly increased in England.

Card-playing seems to have attained its full tide in every part of civilized Europe in the reign of Queen Anne, and was both fashionable and popular in England. Omhre was the favourite game for the ladies, and piquet for gentlemen; clergymen and country squires played whist, and the commoners played at all-fours, put, cribbage, and contraloo. At no other time, before or since, was card-playing so prevalent. Kind landlords used to send a string of hog's puddings and a pack of cards, as a Christmas gift, to every poor family in the parish.

During this reign the card-makers petitioned the House of Commons on the occasion of a proposal to lay a tax of sixpence per pack on cards. "Nine parts in ten of the cards now made," they said "are sold from 6s. to 2½s. per gross, and even those at 6s. will, by this duty, be subjected to 3*l.* 12*s.* tax. This, with submission, will destroy nine parts in ten of the manufacture; for those cards which are now bought for 3*d.* per pack can't then be afforded under 10*d.* or 1*s.* If any of your Honours hope by this tax to suppress expensive card-playing, it is answered, that the common sort who play for innocent diversion will only be hindered; the sharp gamblers who play for money will not be hindered by 12*d.* a-pack." It is stated that "40,000 reams of Genoa white paper were annually imported chiefly for the purpose of making cards. The business was in the hands of small masters, mostly poor, of whom there were no less than a hundred in and about London. Their price to retailers, one sort with another, was three-half-pence a pack, and their profit not above a halfpenny."

We doubt whether so large a quantity as 40,000 reams of Genoa paper was ever consumed in manufacturing playing-cards; if so, the sale must have been far greater than within the last 50 or 60 years, for that quantity of paper would have produced 5,000,000 packs of cards, whereas the amount was only 507,672 packs for the home and export trade in 1851. And as five or six card-makers supply the demand, it appears doubtful whether so large a number as a hundred masters could ever have obtained a living by the trade. Genoa paper was preferred by card-makers up to a late period, for its silkiness, for its power of receiving the colour freely, and for *taking the flint* or glazing better than the harsh English paper. At present there

may be a few reams still consumed by the old-fashioned makers ; but the bulk of the paper is now made here, cards being almost all glazed by passing them between copper-plate through rollers, instead of glazing them with a flint, as formerly.

In the early part of the reign of George III. card-playing was very prevalent.

Until lately the importation of cards was prohibited in Russia, where the manufacture of cards is a royal monopoly. The whole income derived from their sale is applied towards the maintenance of the Foundling Hospital. The manufacture of playing-cards is carried on, on a very large scale, at Alexandroffski, near St. Petersburg. The machinery applied to the manufacture of cards in the Imperial Manufactory is the invention of Mr. Applegath, and is under the direction of General Wilson. All the modern improvements for the manufacture of cards are to be found in that establishment, many having been furnished by Mr. De La Rue. His patent process was adopted for a superior description of cards many years since. The cards printed at Applegath's machine are in water-colours ; and although upwards of 14,000 packs are manufactured daily, the supply is not equal to the demand. The best Russian playing-cards are excellent, surpassing most continental cards in the glaze and all the essential qualities of good cards.

The demand for playing-cards has not kept pace with the increased population of this country ; the duty of one shilling per pack* operating, with other circumstances, such as musical evenings, reading societies, &c., against their greater use.

No person is allowed to manufacture playing-cards in this country except in the cities of London and Westminster, and in the city of Dublin in Ireland. Their manufacture is prohibited in Scotland. The duty is upwards of two hundred per cent. on the cost of manufacture, besides the duty on paper, which amounts to about 6d. on a dozen packs.

In consequence of the reissue of second-hand playing-cards being allowed, forged aces, with the London makers' names, have been introduced from abroad, and used for spurious cards, which are sold for second-hand ; thus causing detriment to the English manufacturer and loss to the revenue. The permission to reissue second-hand cards seems to have been retained in deference to those by whom club-houses are supplied, the cards when once played with becoming the perquisites of the servants, who obtain a certain price from the original vendor, by whom they are again sold. This opens the door for the contraband cards with forged aces, and is undoubtedly a grievance that Government ought to remove. If the duty were reduced from one shilling to threepence per pack, it would put an end to smuggling, forgery, and perjury as regards cards ; the sale would increase, a larger quantity of paper would be consumed, and employment given to a number of extra hands.

The duty and export aces are printed at Somerset House, on paper furnished by the card-makers, who have also to pay thirty pounds for every ace-plate,

* Cut-corner cards are the waste of card-makers, and are not allowed to be sold in regular packs, although they may be sold as waste, provided half an inch be cut off one corner. The wording of the Act of Parliament relative to this subject is so imperfect, that for two or three years cut-corner cards were regularly manufactured and sold ; but the Commissioners of Stamps and Taxes declared the sale illegal, and took proceedings for certain penalties against the retailers. There are still manufacturers who sell these illegal cut-corner cards, to the injury of the fair trader, notwithstanding the threat of heavy penalties.

engraved by Messrs. Perkins and Co., and sent by them to the Inland Revenue Office. If the ace-plate, on which there are twenty aces, be engraved on steel, it will last for a considerable time, but it is notwithstanding a heavy charge on the manufacturer of playing-cards, as two different aces are required, one for the home trade, the other for exportation. Every card manufacturer is required to give two securities in 500*l.* each before a licence can be obtained. When aces are wanted by the card-maker, a requisition is sent to Somerset House, and a ream, containing 9,600, is usually drawn at one time. An officer is sent to the different card-makers with seals, one of which is affixed to each pack required for immediate sale. According to the number of seals furnished to each maker by the officer, the amount of duty of 1*s.* per pack must be paid on the first of each month. The aces remain in stock at the manufacturer's, the quantity in hand being ascertained by officers sent from time to time to inspect them. Should any deficiency be found, the duty must be paid on such deficiency, and the manufacturer is called to account for the irregularity. When playing-cards are required for exportation, the manufacturer has to enter into a heavy bond, with security, to ensure the *bonâ fide* landing of the cards at the port named in such bond, and a drawback of three halfpence per pound is allowed on all cards exported; but it often happens that the expense of the bond for small parcels is such as to make it a matter of indifference whether the drawback be obtained or not; and it certainly checks the sale of cards for exportation, for many persons would buy two or three dozen when they do not wish to take grosses to form an assortment of stationery for exportation.

The amount of duty paid on playing-cards in 1850 was 11,782*l.* 10*s.* sterling, being on 235,650 packs. The number exported, on which there was no duty, amounted in the same year to 329,888 packs.

In the last year, 1851, there was a diminution of duty-paid cards, as well as exports. The number of duty cards sold was 226,576, being 9,000 less than in 1850, and 281,106 packs for exports, being 48,782 packs less than in 1850.

The general mode of painting playing-cards is by stencilling with water-colours mixed with paste. The card-board used in England consists of four sheets of paper; two strong sheets of cartridge are first pasted for the inside of the board; they are hung up to dry, well pressed, and afterwards covered on each side with a sheet of paper, which should be strong and well sized. The outlines of the honours as well as the ornamental backs are printed with a letter-printing press. The pips are stencilled, 20 cards being the usual quantity on a sheet of foolscap. They are packed in what is technically called works; each work should yield 16 dozen and 8 packs of cards. They are well dried and aired, and then rubbed over with Castile soap, that the flint with which they are glazed may pass smoothly over without tearing the card-board. The operation of glazing with a flint is tedious, and causes much waste. When glazed, they are taken to the cutter, and from him to the women sorters; they are carefully looked over, all defective cards being put aside for a cheaper description. All the picked cards are laid at what is called the head of the table, and constitute those denominated "Moguls" (best quality); the seconds, or slightly defective, come next, and are called "Harrys;" the last and most defective are the "Highlanders." A work of 16 dozen that turns out well should yield the following proportions: from 8 to 10 dozen of Moguls, 3 or 4 dozen Harrys, and the remainder Highlanders. They are put in wrappers, with a

thread tied round each pack, sealed by a revenue officer when required, and put up in parcels of six packs, which are called sixaines.*

There was little or no improvement in the manufacture of playing-cards until 1832, when Mr. De La Rue obtained a patent for certain improvements, which consisted in substituting printing with oil colours, in lithography or letter-press, from wood or metal blocks, and using a superior description of quick-drying printing-ink, not liable to set off in glazing. By this process a much sharper impression is obtained, the colours are more vivid, and the backs better ornamented than could be effected by stencilling with water-colours. The patent mode of manufacturing playing-cards has been adopted by many of the German manufacturers, and by the Imperial Government of Russia.

In his work on playing-cards, Mr. Chatto says, that "no other game was ever so generally played by people of both sexes—young, old, rich, and poor. It is, perhaps, as extensively diffused as the use of tobacco, and is certainly indulged in by a greater variety of persons." We are much indebted to Mr. Chatto's "*Facts and Speculations on Playing Cards*" for the valuable information it has afforded us, and of which we have made free use.

The following is a list of the playing-card manufacturers who exhibited:—

England.—Messrs. DE LA RUE and Co. exhibited some beautifully manufactured packs of playing-cards, with ornamental backs of flowers, fruits, and ornaments, from drawings by Mr. Owen Jones; among them a series of four, with interwoven monograms of Her Majesty, His Royal Highness Prince Albert, His Royal Highness the Prince of Wales, and Her Royal Highness the Princess Royal; the monograms in each are surrounded with groups of flowers exquisitely executed in chromolithography. The rose and hawthorn, typical of youth and beauty, surrounds the monogram of Her Majesty; H.R.H. Prince Albert is appropriately represented by the holly, the ivy, and the oak; the fuschia and daisy express the beautiful childhood of H.R.H. the Prince of Wales; the primrose, violet, and lily, the innocence, modesty, and beauty of the Princess Royal.

Messrs. De La Rue had also some cards adapted for near-sighted people, the pips being in different colours—the spades in black, the clubs in green, the hearts in red, and the diamonds in pale blue. These coloured cards were suggested by Sir Frankland Lewis. Messrs. De La Rue's playing-cards, called Victoria cards, surpass all others in finish, quality of paper, perfection of printing, and ornaments on the backs.

Mr. WHITTAKER, of London, contributed some single cards, of various patterns, as examples of playing cards in gold and colours; the designs of these are commendable, but as none were exhibited made up in packs, the Jury could not ascertain the degree of merit which would be due to them in a manufactured state.

There were several exhibitors of playing-cards from foreign countries, viz.:—

France.—M. BLAQUIÈRE, of Paris, who had some with the pips in different colours. M. HULOT had some court card-forms electrotyped.

* It is a curious fact that the *technical terms* used in the workshops of playing card-manufacturers in this country are *French words*, such as *sixens* (sixaines), *brief*, *bref* (short), &c. &c.; this seems to imply that practical card-making was introduced by the French into England.

Belgium.—Mr. DAVELUY D'ELHOUNGNE, of Bruges, specimens said to be printed by a new process, but the Jury could not discover any particular merit.

Frankfort-on-the-Main.—M. C. L. WUEST, who appears to have adopted De La Rue's patent process, exhibited some cards with defined pattern backs printed in register, well-executed; and he deserves mention as having produced good specimens of that particular style.

Grand Duchy of Hesse.—MM. FROMMANN, of Darmstadt, had good and well-made specimens. Mr. REUTER, of Darmstadt, had some printed with oil-colours. Mr. H. L. SCHNAPPER, of Offenbach, displayed some well-manufactured specimens.

Austria.—Mr. G. STEIGER, Vienna, exhibited very well-made cards.

Sweden.—Mr. HEURLIN, of Stockholm, well-made and well-glazed playing-cards.

Denmark.—Mr. L. P. HOLMBLAD, of Copenhagen, had also some good playing-cards.

The playing-cards exhibited by these different countries indicate a marked advance in the manufacture of that article.

V. MESSAGE CARDS.

Above thirty-five years since, the late Mr. W. Creswick, paper-maker, introduced a superior description of blank visiting and message cards, which until that period had been supplied by playing-card makers from their refuse boards. The great encouragement given by engravers, printers, and the public to the superiority of Mr. Creswick's cards, induced other persons to embark in this branch of the paper trade. New and important manufactories have risen, and there are now several in this country. The English blank cards are made of excellent paper; the best are made with drawing-paper; they are generally superior to those of any other country. It does not appear that any manufacturers have paid as much attention to their production as the English.

VI. DRAWING-BOARDS.

Drawing-boards should be manufactured of the best hand-made drawing-papers. Messrs. Hollingworth, of Turkey Mill; Messrs. Balston (under the well-known name of J. Whatman); Richard Turner, of Chafford; Mr. Wilmot; Messrs. Evans, of Derby, and one or two others, are the principal makers of vat-papers fit for the purpose. When two or more sheets are pasted together, well rolled and pressed, they become London drawing-boards, best quality; Bristol boards are an inferior sort. There are several manufacturers of drawing-boards in London. Only two exhibited, Messrs. TURNBULL, of Holywell Mount, Shoreditch, and Messrs. DE LA RUE, of Bunhill Row. Messrs. GODIN, of Liège, and one or two French paper-makers, also sent samples, but none were equal to the best London boards.

VII. ENVELOPES.

The number of English exhibitors in this now important branch of the paper trade was nine; the most prominent of whom, Messrs. DE LA RUE, had a patent folding-machine at work, in the Main Avenue, during the whole period of the

Exhibition, which attracted the public in such crowds that many were disappointed in their endeavours to see it. An idea may be formed of the magnitude to which this new trade has already grown, when we state that twelve of these machines fold and gum weekly nearly two millions of envelopes. The number of exhibitors from France was three. From other countries, there were none of any importance.

The use of envelopes was common in France before their introduction into England. It was not till 1839, in consequence of Mr. Rowland Hill's postage reform, that any important consumption took place in this country, yet little progress was made in the manufacture of envelopes until March 1845, when Mr. Edwin Hill and Mr. Warren De la Rue obtained a patent for cutting and folding them by machinery. Until this period envelopes were imperfectly folded by hand with a bookbinder's folding-stick, 3,000 per day being about the quantity an experienced workwoman could produce.

Before the penny postage, 26,000,000 letters passed annually through the Post Office. In 1850, 347,000,000 letters were posted; of this large number nearly 300,000,000 were enclosed in envelopes! Besides the plain envelopes for commercial purposes, there is a large consumption of fancy and ornamented envelopes, a considerable quantity of which are exported to most parts of the world.

The manufacture of envelopes gives employment to great numbers of young boys and girls, whose wages range, in England, from six to nine shillings per week.

Messrs. WATERLOW also had a folding-machine at work in the Machinery Department. It was patented by M. Rémond some years after that of Messrs. De La Rue and Co.

Messrs. PINCHES, Oxendon Street; Mr. JEREMIAH SMITH, Rathbone Place; Mr. J. MANSELL, Red Lion Square; Messrs. DORRIS and Co., Fleet Street; Messrs. COWAN and Co., Edinburgh; Mr. F. RALPH, Throgmorton Street; all exhibited good and well-made envelopes. A collection of envelopes with embossed seal flaps, tastefully designed and appropriate for the use of the several colleges, were exhibited by Messrs. SPIERS and SON, of Oxford.

Mr. JAMES DUDMAN, Camberwell Place, New Road, exhibited three sorts of self-sealing envelopes; very ingenious, but presenting no commercial advantages over the adhesive envelopes already in use.

France.—M. BERTOU, Rue Faubourg St. Martin, Paris, exhibited a quantity of envelopes of ordinary make. M. MARION, Cité Bergère, Paris, a large variety of envelopes, well manufactured. This exhibitor stated that he had a folding-machine for envelopes; every inquiry was made for it, but it could not be found. M. T. P. VALANT, Faubourg St. Antoine, Paris, exhibited envelopes of ordinary qualities, said to be cut by machinery.

Belgium.—M. E. TARDIF, of Brussels, exhibited a quantity of mourning and other envelopes of ordinary qualities and make.

Zollverein.—M. P. RUHL and SONS, Hesse Cassel, displayed a series of embossed and printed envelopes.

America.—The BELVIDERE COMPANY, Richmond, Virginia, exhibited a peculiar description of buff paper for envelopes, which is in great demand in the United States.

VIII. FANCY STATIONERY, &c.

It is almost impossible to enumerate the various description of articles belonging to this class of goods. They comprise albums, scrap-books, portfolios, music-books, manuscript books, writing-desks, cabinets, envelope-cases, portefeuilles, pocket-books, metallic memorandum-books, card-cases, blotting-books, lace-papers, gold printed papers, valentines, embossed boards, wedding envelopes, gold and silver medallions, fancy wafers, porte-monnaies, and numberless similar articles. There were several English and foreign contributors of fancy stationery, which will be noticed under the following heads:—

LACE PAPERS.—This is a description of pierced paper and cardboard in imitation of lace, the improved manufacture of which took place in England about 1831. Long before this period *thin* pierced lace-papers had been made in France, chiefly for ornamenting fruit packed in card-board boxes. This particular description of thin perforated papers continues to be made for ornaments, such as lamp-shades, of which M. DEVRANGE, jun., 257 Rue St. Denis, and M. ARRAULT, 106 Rue St. Denis, contributed numerous fine specimens; and for borders to mount small religious engravings, of which Madame BOUASSE, 9 Rue du Palais de Bourbon, St. Sulpice, exhibited some pretty varieties, carefully and neatly got up. The mode of perforating thick paper and card-board by machinery was first applied by M. MARC LA RIVIÈRE, a Swiss watchmaker, who obtained a patent above twenty years ago, for perforating zinc and other metallic plates, and established a manufactory at Hackney, near London. Mr. De La Rue having been invited to see this manufactory, suggested its application to paper and card-board, and entered into arrangements with La Rivière to carry out this beautiful and novel paper ornament. Very large quantities of perforated card-boards have been, and still continue to be, exported. They are used for embroidering on with silk and coloured beads. Another and more beautiful imitation of lace is obtained by a process now extensively in use, which was invented by Mr. Addenbrook, of London, and applied to the lace bordering of note and other paper. Some specimens, applied to pretty valentines, were exhibited by Mrs. HUBER and by Mr. MOSMAN, and for other purposes by Messrs. DE LA RUE and Co., Messrs. DOBBS and Co., Mr. J. MANSELL, Red Lion Square, and Mr. Meek, Crown Court, Fleet Street.

France.—M. MARION, M. B. DEVRANGE, and M. ARRAULT of Paris, exhibited various specimens of well-perforated fancy and letter papers.

FANCY PAPERS.—These consist of numerous varieties of papers, printed in gold, silver, and colours; some by lithography, chromolithography, surface printing, block printing, in the manner of calico printing, from woven wire, as patented by Mr. De La Rue, and also of papers covered over with real gold and silver, and imitation gold and bronze, embossed or grained by means of engraved rollers, dies, and plates, of varnished papers to imitate morocco, and numerous other descriptions. They are used for the card-board boxes now so generally adopted for packing goods, for wrapping and ornamenting superior fabrics, and for many other purposes. There were several English and foreign exhibitors: the principal were Mr. ANGRAND, Mr. GUESNU, and Mr. VANDERDORPEL, of Paris; M. A. DESSAUR, of Aschaffenburg, Bavaria; M. FREUND, M. J. B. WEBER, and WUEST BROTHERS, of Offenbach; M. FEITNER, of Guben; M. E. MONTAG, of Berlin; and Messrs. DE LA RUE and Co.,

of London, at whose stall pattern-books containing many hundred specimens of chaste and elegant designs, were exhibited.

PLAIN SURFACE COLOURED PAPERS.—This description of paper is coloured by means of brushes similar to those employed by paper-stainers for decorating houses, but requires more care in laying on, smoothing, and finishing, as well as colours of a finer description. It is used by bookbinders, printers, button-makers, confectioners, and numerous other branches of trade, giving employment to hundreds of men, women, and children. The contributors were Messrs. DE LA RUE and Co., who displayed a beautiful assortment of coloured papers arranged systematically on the plan of Chevreuil, to show the effects of contrasting colours: these papers were placed in two rows, about one foot distant, so that as the observer moved they shifted their apparent position with regard to each other, a number of different effects of contrast being thus brought out.

Messrs. J. and R. NEWBERRY, Hemlock Street, Carey Street, had well-manufactured gold and coloured papers in great variety.

ENAMELLED PAPERS.—The advance of chemistry as applied to colour-making is exemplified in the beautiful white glossy colour with which enamelled papers are prepared. Artificial sulphate of barytes, made from the native carbonate, was for many years manufactured and sold by Mr. Hume, of Long Acre, at one guinea per lb., under the name of *permanent white*, and used by water-colour painters, who prized it for its unchangeable qualities. It was subsequently applied by Mr. De La Rue to enamelling paper, when the price was reduced from one guinea to *sixpence* per pound. It is extensively used by paper-stainers, both in England and France, for the ground of their fine satin paper-hangings. Enamelled paper is used for printing in gold, bronze, and other metals, and from its delicate and glossy surface it is also used for wrapping superior articles of manufacture. There is another and more expensive description of enamel colour, with which the highly glazed invitation and visiting cards are manufactured. These cards were introduced in England about twenty years since, by Mr. Sturz, on his return from Frankfort, in which city they were first made. Mr. Sturz obtained a patent for improvements in copper-plate printing, and described the material he used as the "best and purest white lead." This proved fatal to his patent, for having obtained an injunction against Messrs. De La Rue, who manufactured enamel cards with barytes, Lord Chancellor Lyndhurst held that the specification was too vague, and that the commercial name should have been given, namely, "Kremnitz white lead." The injunction was dissolved, with costs, and the manufacture of enamel cards thrown open.

The enamelled boards, cards, and paper of M. BONDON, of Paris, were of excellent quality.

Zollverein.—M. SCHREIBER, of Merseburg, displayed an assortment of enamelled card-boards of great beauty. M. VEIL and Co., of Stuttgart, had enamelled card-boards of excellent quality; and M. WEBER, of Offenbach, Grand Duchy of Hesse, exhibited enamelled card-boards of average quality.

Messrs. DE LA RUE and Co., of London, had beautiful specimens of enamelled card-board, prepared with Newton's thin film, under the name of opaline enamel.

METALLIC MEMORANDUM BOOKS.—The paper for this description of books is prepared on the surface, and when written upon with a pencil, the point of which

is composed of certain metallic alloys, the writing becomes almost as permanent as if it were in ink. The method of preparing the paper for this purpose is not new, but its various and useful applications are of recent date. The contributors of metallic books were MESSRS. DE LA RUE and Co., who had a variety bound in russia leather, morocco, calf, roan, and velvet. They had also indelible diaries, neatly printed and ruled, in two colours. Mr. CHARLES PENNY, of the Old Bailey, had numerous good specimens in a variety of elegant and useful bindings. M. SCHLESSINGER had also metallic memorandum books, with flexible backs to admit loose documents.

SCRAP BOOKS.—MESSRS. ACKERMANN and Co. contributed a large imperial folio, elegantly bound; MESSRS. DE LA RUE and Co., a variety of scrap-books in suitable bindings; Mr. GEORGE CROSS, of New Coventry Street, exhibited specimens of a new mode for fastening the leaves of scrap-books on oval wooden backs, without guards, enabling prints and drawings to be placed close to the back with less risk of injury to the edges. MESSRS. ROCK and Co. exhibited three large scrap-books with numerous lithographed English views. M. ANTOINE MAITRE, of Dijon, Côte d'Or, France, had scrap-books of an average quality.

PORTFOLIOS.—There were twenty manufacturers of fancy leather goods, who contributed portfolios. The numerous specimens in papier-maché covers did not belong to Class XVII.

The manufacture of portfolios has reached a high degree of perfection in Germany, both as regards the outward appearance and the excellence of the workmanship. Offenbach is the principal seat of this manufacture in Germany. In the establishment of MESSRS. Jacob Mönch and Co., 500 persons are employed. There is also a steam-engine of twelve-horse power. All kinds of small wares in leather goods are manufactured by MESSRS. Mönch and Co. MESSRS. DE LA RUE and Co., of London, exhibited portfolios, registered under the name of "McCabe's," in a variety of sizes suitable for "The Times," "Athenæum," "Illustrated News," "Household Words," and other similar works. By means of this contrivance, single sheets, pamphlets, and books published in parts can be fastened in an easy manner, consecutively or otherwise, to form a compact mass as if bound, although they can be removed and again inserted at pleasure—an improvement on the ordinary files intended to contain newspapers and sheets of a similar description. Mr. T. HOOD, of Red Lion Square, had a handsomely bound folio of a large size, and Mr. RICKMAN, of Wexford, Ireland, exhibited a folio to be attached to the wall; an ingenious plan, for the purpose of showing drawings and prints to advantage.

France.—M. LAURENT, Rue Chapon, and Widow SCHLOSS and BROTHER, of Paris, had each some good specimens.

Zollverein.—M. C. GEBHART, of Berlin, had a portfolio in morocco and velvet, stamped in gold, and in relief, of excellent workmanship. M. KUHN and SON, M. MOSMER, and M. SCHMERBAUCH, of Berlin, and M. I. SELENKA, of Brunswick, had all samples of an average quality. From Wurtemberg, M. G. REICHHOLD, of Stuttgart, deserves mention for a very fine specimen of good workmanship. MM. SHENK and Co., also of Stuttgart, had a folio of fair quality. From Bavaria M. ESCHERISCH, of Munich, exhibited a folio of ordinary description. From the Grand Duchy of Hesse, M. H. NAENNY, of Bergen, had a large folio in red mo-

rocco, beautifully finished and gilt: and from Offenbach the following makers, in addition to those already named, deserve mention as showing the advanced progress of this branch of manufacture: MM. BERGE BROTHERS; MM. HAAS and Co.; MM. KLEIN and Co.; M. LUETTRINGHAUS; and MM. SEELING and BECKER.

ALBUMS.—The manufacture of albums forms an important item of fancy stationery, and admits of every variety of ornamental display in the bindings, from the cheapest to the most costly and elaborate descriptions. M. HABENICHT, of Vienna, contributed three specimens, which were in the Queen's bookcase in M. LEISLER's Austrian rooms. One in dark-blue velvet, with silver mountings; one in green, with delicately pierced work in ivory; and one in tortoiseshell, with gilt and silver inlaid embellishments. These very beautiful covers are from designs by Professor Raesner, and are of superior workmanship. The other exhibitors from Vienna were M. RAUH, M. H. F. MÜLLER, and M. NEUMANN, who all had albums deserving commendation. From Berlin, M. LEISEGANG exhibited an album in velvet, neatly gilt. M. GEBHART, M. SCHÄENING, and M. KUHN and SON had specimens deserving mention. M. W. BEISSER, of Kothen, had an album of coloured drawing-papers, and a blotting-paper case, beautifully worked in velvet and gold. From Belgium M. PARENT displayed Bevoort's Album de Pomologie, containing written and illustrated descriptions of the most remarkable fruits. From Switzerland, M. SPOLINGER, of Schaffhausen, an album of wood-cuts, the designs by Swiss artists. From France, M. GODEFROY, of Paris, exhibited a beautiful album of the Society of Literary Men, containing a collection of drawings and autographs, and M. PILLAUT had an album with neatly embroidered covers.

In the English department Messrs. DE LA RUE and Co. displayed an assortment of albums in carved wood and in morocco, Russia leather, and velvet bindings. The tooling and gilding were produced by the combination of four hundred tools, engraved in a new style expressly for the purpose from designs by Mr. Owen Jones.

POCKET-BOOKS.—This branch of trade was confined in London to some few makers of writing and dressing-cases, ladies' work-boxes, plain blotting-cases, and pocket-books, till the year 1828, when a great stimulus was imparted to every branch of fancy stationery by Mr. De La Rue, who introduced many novelties and improvements, which created a demand for all descriptions of fancy leather goods, including many new varieties. There is now a considerable export trade* in these articles. The solidity of English workmanship in leather goods is proverbial; the men in the principal workshops take a pride in their work, securing good pay to themselves, and to their employers unrivalled superiority in the execution of their productions. The number of hands employed is now 468 men and 258 girls, in the following 14 towns, viz.: in London there are 308 men and 20 girls; in Sheffield, 47 men and 200 girls; in Birmingham, 50 men and 30 girls; in Manchester, 9 men; in Liverpool, 10 men; in Edinburgh, 15 men; in Aberdeen, 3 men; in Newcastle, 2 men; in Leeds, 9 men; in Halifax, 2 men; in Bradford, 3 men; in Dublin, 5 men; in Bristol, 3 men: and in Bath, 2 men. The principal English manufacturers in Class XVII. were Messrs. DE LA RUE and Co., who contributed

* The English exports of stationery in 1851 amounted to 401,304*l*. This includes numerous small articles of manufactured leather goods.

every variety of pocket-books, envelope-cases, card-cases, writing-desks in leather, velvet, and oak, solid sketch-books and drawing-blocks, despatch-boxes, wallets, blotting-cases, indelible diaries, and numerous other articles belonging to the trade of pocket-book manufacturers. Mr. MECHT, in Class XXIX., contributed a large and elegant variety of dressing-cases, blotting-cases, and every description of goods appertaining to this branch. Mr. SMITH, Class X., had a case in the Main Avenue filled with a complete and elegant assortment of leather goods, consisting of desks, envelope-cases, blotting-cases, &c. &c. Mrs. SCHLESSINGER, of the Old Jewry, had some pocket-books, letter-clips, &c.

France.—Widow SCHLOSS and BROTHER, whose manufactory in Paris is replete with presses, tools, and other appliances necessary for the production of portemonnaies and similar leather articles, had a splendid assortment of well-manufactured goods in their *specialité*.

CARTONNAGE-PAPER BOXES.—It is only within a few years that manufacturers in this country have adopted the mode of packing their goods in paper boxes. There is now a very large quantity of boxes manufactured in England, and although generally inferior in point of elegance to those made in France, some sorts are cheaper in England, notwithstanding the very high paper duty of 1½d. per lb. They are made principally in London, Manchester, Birmingham, Nottingham, Leicester, and other manufacturing towns, and in Belfast, giving employment to a large number of hands.

In Paris four thousand persons are employed in the manufacture of paper boxes. The trade is divided into six distinct branches. The first comprises the most elaborately finished and ornamented boxes, for the display of artificial flowers, rich velvets, ribbons, satins, silk trimmings, medals, miniatures, and *corbeilles* for wedding presents. The second class consists of boxes and small ornaments for confectioners. The third description is used for packing glasses, trinkets, and such goods as are sold at 25 sous (1s. 0½d.) Boxes for perfumery, for fans, gloves, &c., constitute the fourth branch. The fifth is chiefly applied to the manufacture of boxes for counting-houses, and large boxes for shawls and ribbons for exportation. The sixth and last comprises pill-boxes, wafer-boxes, and boxes for small wares. The *Cartonnerie* of Paris is superior to that of any other country, both as regards the neatness of execution, and the light and elegant style of ornamentation. There is also a description of *cartonnerie* manufactured at Bordeaux for fruit-boxes. The principal exhibitors from Paris were Madame MAYERS and Mr. DOPFER. From England, Mr. TAYLOR, of Nottingham, had a stall in the Machinery Department, where he exhibited a variety of paper boxes.

BLACK-LEAD PENCILS.—Plumbago (carburet of iron) is the substance known under the name of black-lead, although it contains no lead, the popular name having no other foundation than the lead colour which it imparts when traced upon paper. Beckmann states that black-lead pencils were in use in 1565. The best plumbago is produced from the Cumberland mines. The pits are situated on the Borrowdale mountains, ten miles from the town of Keswick. The whole produce of these mines is sent up to London, where it is sold at an auction held once a month, at a house in Essex Street, Strand. The produce of six weeks' annual working of these mines is said to be from 30,000*l.* to 40,000*l.*

Plumbago is found in the neighbourhood of Ronda, in Grenada, and near

Malaga, in Spain, but it is hard and difficult to grind. The best substitute for Cumberland plumbago is that of Bohemia and Bavaria. It is also found at Rhodéz (Aveyron), France. An inferior kind of plumbago is imported from Ceylon and Mexico.

In 1822 the late Mr. Mordan patented the application of plumbago in the form of very small cylinders, projecting from a cylindrical cone fitted to a pencil-case, which soon became in general use, and of which there are now many inferior imitations. Mr. Brockendon, of London, has since patented a mode of compressing the dust of plumbago, imparting to it nearly the same firmness and quality as when in its original state from the Cumberland mines.

The manufacture of black-lead pencils has been considerably improved within the last ten years. Partly by the purification of good plumbago, and partly by the admixture of other substances, good black-lead pencils are produced without Cumberland plumbago, at considerably reduced prices. The qualities necessary in a good lead pencil differ very much according to the purpose for which it is to be used; a deep black mark, combined with great softness, being required for some uses, and for others the greatest hardness, with the power of pressing lightly. The articles exhibited prove how completely manufacturers have met these requisitions, by the numerous fine specimens in more or less elegant settings.

Among the best English makers who exhibited were Messrs. BANKS, SON, and Co., of Keswick, who had specimens of pure Cumberland lead and composition used in the manufacture of black-lead pencils, specimens of the various stages of manufacture, from the raw material to the complete pencil, and pencils in various style of finish. Mr. MORELL exhibited combined mechanical appliances for the preparation of lead pencils. Messrs. WOLF and SON had specimens of pure Cumberland lead; specimens of compressed Cumberland lead; specimens of Ceylon plumbago, as produced from the mine, and some prepared and compressed; specimens of Malaga plumbago, as produced from the mines, and also some prepared and compressed. Messrs. ROWNEY and SON, of Rathbone Place, Messrs. BROOKMAN and LANGDON, of Great Russell Street, Mr. R. ADAIR, of Maryport, and Messrs. REEVES and SON, also exhibited black-lead pencils. Mr. BROCKENDON, of Queen Square, exhibited plumbago from Cumberland, Ceylon, Davis' Straits, Spain, Bohemia, Greenland, California, and France.

France.—The well-known establishment of GILBERT and Co., in Giret, deserves mention. Sixty workmen, with an eight-horse steam-power engine, are employed in this establishment.

Zollverein.—The pencils exhibited by Messrs. A. W. FABER and STEIN, of Nuremberg, were of the best description, and the prices extremely low. They employ upwards of 300 workmen. They export their pencils to Italy, Paris, Vienna, America, Russia, Great Britain, and other places, the demand being created by cheapness and good quality. MM. J. J. REHBACH, in Regensburg, exhibited specimens of their pencils, well known under the name of *Regensburg pencils*, fully maintaining their well-founded reputation. Mr. BIRKMANX, of Nuremberg, had some black-lead pencils of fair quality.

Austria.—MM. L. and C. HARDMUTH had some specimens of pencils of excellent quality.

The English exhibitors of black-lead pencils were not in Class XVII., and it

was not until the Jury had nearly finished their labours that they were requested to examine these productions.

SEALING-WAX.—Wax appears to have been used in Europe for sealing since the earliest ages. It has been asserted that sealing-wax was invented by a Frenchman in 1640. Beckmann quotes that Francis Rousseau, having during the latter year of the reign of Louis XIII. lost all his property by a fire, in order to maintain his family, prepared sealing-wax from shell-lac, as he had seen it manufactured in India. By this article Rousseau is said to have gained 50,000 livres in a year.

Mr. Jonas, known under the name of Jones, was the first manufacturer of sealing-wax in England. He had an apprentice about 1780, called Champante, who much improved sealing-wax, and became known at the beginning of the present century as a celebrated sealing-wax maker. Messrs. Champante and Whitrow were long known as wholesale stationers and sealing-wax makers in Jewry Street, Aldgate, even within the last 40 years. All fine wax was then called "Dutch wax," and although made in England, it was stamped with a Dutch brand. Some sorts are still called Dutch wax, but this name denotes an inferior description. Sealing-wax is composed of the best shell-lac and Venice turpentine; the red is coloured with vermilion, and the black with the best ivory black. Other colours are obtained by mixing with it different metallic oxides. The wax used for the Great Seal of England is made up according to a recipe kept in the Lord Chancellor's office. It appears to be composed of a compound of oils and balsams, and has a whitish appearance. The wax of the Great Seal and Privy Seal of Scotland has been manufactured by Mr. Waterston, of Edinburgh, for many years. It is made from resin and bees'-wax, coloured with vermilion. The Exchequer Seal is green. Seals made of soft wax, like that now used for the purpose, do not last, nor does this soft wax yield so good and clear an impression as if it were made with the best shell-lac. There was, in a small case in the Portuguese Court at the Great Exhibition, some sealing-wax bearing a close resemblance to that from India. Sealing-wax was common in Portugal about 1560, and is supposed to have found its way there from India. Neither the French nor the German sealing-wax is so strong in shell-lac as the English. Camphor does not appear to have been added in the manufacture of sealing-wax until the middle of the last century: there is only a small portion of camphor in the Indian wax. If camphor be used in the manufacture of wax, although it much improves the burning, it renders it unfit for use in foreign climates. Good impressions can be made with the finest red wax at a temperature of 140° Fahrenheit, whilst 170° is required for India wax. Charter wax, like that of the Great Seal of Scotland, can be sealed at 118°.

Shell-lac is bleached to a cream colour by chemical means, and sealing-wax is made with it of a variety of delicate shades. In the Great Exhibition the French and Belgian cases contained a variety in the most beautiful colours, got up with great care and taste. Mr. WATERSTON, of Edinburgh, exhibited the Charter wax, red and green, India and bottle-wax, and every variety of shell-lac wax, bleached, unbleached, embossed, and plain. The English manufacturers of sealing-wax have made great improvements within the last 15 years. The English vermilion being bright enables manufacturers of sealing-wax to impart great brilliancy to their wax. Messrs HYDE, of Fleet Street, had some beautiful specimen in great variety. Mr.

HENRY MORRELL, Fleet Street, exhibited various specimens illustrating the manufacture of sealing-wax, rough sealing-wax, sticks of sealing-wax moulded and partly polished, finished and stamped; sealing-wax in packages and of various qualities. MESSRS. COOKE and SONS, of Cannon Street, had specimens of coloured, embossed, and transparent sealing-wax, with various impressions. The EAST INDIA COMPANY had some specimens of India wax.

France.—MM. VINCENT and TISSERANT, Rue Michel-le-Comte, Paris, exhibited specimens of sealing-wax of good quality.

Belgium.—M. ZEGELAER exhibited various coloured sealing-wax.

Portugal.—M. MANOEL RODRIGUEZ LATA, of Lisbon, had some sealing-wax of different colours, closely resembling India-wax.

Zollverein.—M. T. MANUEL KOHN, of Main-Bernheim, Bavaria, exhibited specimens of sealing-wax.

Most of these exhibitors were not in Class XVII.; the Jury had nearly completed their examination when they were requested to examine sealing-wax exhibited by contributors out their class.

AWARDS.

The Jury have awarded a Council Medal to the IMPERIAL COURT AND GOVERNMENT PRINTING OFFICE OF VIENNA (Austria, 362), for their new processes in typography, galvano-plastic, and chemotypic printing; for the variety of their Oriental types, and perfect execution of the punches, as well as for the general excellence of the numerous specimens exhibited in stereotyping, electrotyping, printing, and bookbinding.*

And Prize Medals to the following Exhibitors in the various departments of Class XVII.:—

ANGRAND, 59 Rue Meslay, Paris (France 7), for general excellence in ornamental, coloured, and fancy papers.

ATKINSON, WILLIAM, dyer, Lamb's Passage, Finsbury, London (56), for his superior finish of bookbinders' cloth.

BARRITT and Co., bookbinders, Fleet Street, London (196), for excellence in binding Bibles and Prayer-books, and for the neatness with which every leaf of a folio Bible is ornamented with blue edging.

BARÈRE, B., engraver, 62 Rue Mazarin, Paris (France, 40), for his superior engravings by Collas' tracing-machine.

BENLEY, R., and Co., Fann Street, Aldersgate Street, London (195), for the variety, beauty, and originality of their types.

BLANCHET BROTHERS and KLEBER, paper manufacturers, Rives (Isère), (France, 1090), for general excellence in their white and coloured papers.

* The following resolution was moved by M. Didot, seconded, and unanimously passed by the Jury, at the sitting of the 21st of June 1851.

• That the following paragraph be inserted in their Report—

“ That the Jury regrets that the position of Mr. DE LA RUE, as a Juror, has not allowed this Jury to recommend that the Council Medal be awarded to him, which in their opinion he so justly deserves, both as an inventor of acknowledged distinction, and for having exhibited a great number of specimens of general stationery and playing cards, among which the Jury has specially noticed the papers of Mr. Richard Turner, of Chafford, Kent.”

BONE and SON, Fleet Street, London (62), for cheapness and excellence in cloth bookbinding.

BROCKHAUS, F. A., printer and publisher, Leipzig (Saxony, 178), for his collection of three hundred and fifty-six volumes, the whole printed at his own establishment in the year 1850.

BRADBURY and EVANS, printers, Whitefriars, London (136), for general excellence in various specimens of printing.

CALLAUD-BELISLE, NOUËL DE TINAN, & Co., paper manufacturers, Angoulême (France, 788), for the good quality of various papers.

CASLON and Co., type-founders, Chiswell Street, Finsbury, London (78), for the beauty and great variety of well-finished types.

CHIRIO and MINA, Turin, Sardinia (Sardinia, 89), for superior workmanship in a folio volume, the "History of Hautecombe Abbey," with woodcuts and other borders, also for some printing materials.

CLARKE, J., Frith Street, Soho, London (68), for various specimens of book-binding; the hand-tooling of which is well executed, with great solidity in the forwarding. Some tree-marbling on calf leather is carried to great perfection.

CLAYE, J., printer, 7 Rue St. Benoit, Paris (France, 798), for superior workmanship in woodcut and other surface printing.

CROSS, G., 2 New Coventry Street, Leicester Square, London (88), for a new mode of fastening the leaves of scrap-books without guards.

CUSSENS and Co., dyers, Bunhill Row, Finsbury, London (69), for their bookbinders' cloth; the crimson and ultramarine blue are bright and beautiful, and show a marked advance within a few years in this important branch of manufacture.

DEWDNEY, J., Collumpton, Devonshire (143), for the excellence of his writing papers, and also for the permanent dye of his blue papers for the use of starch manufacturers.

DERRIËY, M., type-founder, 8 Rue Notre-Dame-des-Champs, for his improved music types and flourishes, and for the perfection of various founts exhibited.

DECKER, R. L., printer, Berlin (Prussia, 148), for his Oriental and other types; for the excellence of his printing, as exemplified in a large folio New Testament, and in the works of Frederick the Great, all of which are well got up, the paper, type, and ink, being of the best quality.

DREWSSEN and SONS, Silkeborg, Jutland, Denmark (Denmark, 4), for a specimen of cream-laid writing-paper, well glazed, in long lengths.

DESROSNIERS, A., printer, Moulins, (Allier), (France, 817), for general excellence, as exemplified in six volumes exhibited; a remarkable specimen of good printing, considering the disadvantages a printer labours under in a country town.

DOUMERC, E., the Joint Stock Paper-making Company of the Marais and Ste. Marie Paper-mills, Jouy, St. Morin, Seine-et-Marne (France, 822); dépôt, 3 Rue du Pont de Lodi, Paris; for the excellence of printing, writing, and drawing machine-made papers.

DOWLING, H., Van Diemen's Land (Van Diemen's Land, 331 and 333), for a specimen of Tasmanian printing, as shown in the Tasmanian Calendar and Tasmanian Journal.

DUPONT, P., 55 Rue de Grenelle-St.-Honoré, Paris (France, 181), for

superior skill in producing fac-similes of old books, and for general excellence in printing.

DUZOGLOU, Messrs, Smyrna (Turkey), for excellence in writing papers.

THE EAST INDIA COMPANY, for their valuable collection of India papers.

EBART BROTHERS, paper manufacturers, Berlin (Prussia, 145), for general excellence in papers, glazing-boards, carton-pierre for roofing, and paper with water-marks for bank-notes.

EGYPT, HIS HIGHNESS THE VICEROY OF (Egypt, 248 and 374), for a collection of one hundred and sixty-five volumes of books, printed in the Arabic, Persian, and Turkish languages, at Boulac, near Cairo, and likewise for a catalogue of all the books published in Egypt.

EVANS, J. S., bookbinder, Berwick Street (8), for the clean and superior finish of his binding in white vellum, and the general excellence of the various specimens exhibited.

FABER, A. W., pencil-maker, Stein, Bavaria (Bavaria, 81), for the perfection of his black-lead pencils, for sketching, engineering, and architectural purposes.

FISHER, J. H., Hoxton (10), for a new and ingenious mode of printing from copper-plate in two colours at one operation, with a peculiar ink, which resists water, but is altered by the usual chemical reagents, and which may be usefully applied to the printing of bank-notes and cheques.

FIGGINS, V. and J., type founders, West Street, Smithfield, London (124), for the excellence and beauty of their types, and for the care bestowed in the finishing to insure correct justification.

FISCHER, C. F. A., paper-maker, Bantzen, Saxony (Saxony 168), for the excellent quality of his plate, lithographic, printing, and writing papers; the engine-sizing of the writing-papers is very superior. A specimen of a large machine-made millboard, 1 inch thick, 3 feet wide, and 6 feet long, deserves special notice.

GAYMARD and GÉRAULT, 10 Rue Montmorency, Paris (France 518), for their specimen of ledger binding. The large ledger in rough calf contains no less than one thousand ruled leaves, is well bound, opens very freely, and is a specimen of excellent work.

GILBERT and Co, pencil-makers, Givet, Ardennes (France, 238), for the excellence of their pencils.

GODIN, I. L., and SON, paper manufacturers, Huy (Liège), (Belgium, 284), for a large variety of printing, writing, and drawing papers, in all of which great perfection is attained.

HABENICHT, A., bookbinder, Vienna (Austria, 376), for general excellence in bookbinding and in porte-monnaies, and leather goods of a similar description.

HARDTMUTH, L. and C., pencil-makers, Vienna (Austria, 381), for the good quality of their pencils.

HANICQ, P. J., Mechlin (Belgium, 285), for his large collection of printed books, combining cheapness with good workmanship. His liturgies in red and black deserve notice.

HAASE, G., and SONS, printers and type-founders, Prague (Austria, 367), for the general excellence of their types and printing.

HAYDAY, JAMES, bookbinder, Little Queen Street, London (106), for his supe-

rior workmanship, exemplified in the books exhibited by Messrs. Cundall and Adley.

HERRICK, J. K., stationer, New York (United States, 502), for his superior ruling of account-books.

HONIG, B. C. and I., Zaandyk, Netherlands (Netherlands, 59 and 60), for specimens of superior parchment, and the excellence of their double elephant writing paper.

HOWE, S. G., Boston, United States (United States, 439), for superior characters for the blind, of an angular form, without capitals; this system is more simple than any hitherto attempted, and easier to distinguish by the touch.

HOSCH and SONS, paper manufacturers, Duren (Prussia, 392), for the cheapness and perfection of their white and coloured writing and tissue papers, among which the black and rose colour are of peculiar brightness.

HYDE and Co., sealing-wax manufacturers, Fleet Street, London (21), for the general excellence of their wax, some of which is said not to soften under a temperature of 120° Fahrenheit, and is therefore adapted for hot countries, as at this temperature it still retains the seal impression.

JOYNSON, WILLIAM, paper-maker, St. Mary Cray, Kent (42A), for the superior quality and finish of his writing papers.

IONOHAUS and VENATOR, Darmstadt, Grand Duchy of Hesse (Hesse, 6), for letter-press relief coloured maps. The different minerals of each district are shown by appropriate colouring. (Medal awarded in Class I.)

LAMB, J., paper-maker, Newcastle-under-Lyme, Staffordshire (147), for excellence in the manufacture of pottery tissues.

LABOULAYE, C., and Co., type-founders, 30 Rue Madame, Paris (France, 895), for great skill exhibited in the finish of their printing types.

LEGRAND, MARCELLIN, type-founder, 99 Rue du Cherche-Midi, Paris (France, 584), for the general excellence of his types; for his specimen of casting, wherein one hundred and forty letters are cast at once; for his collection of Chinese types; and for the beauty of various specimens exhibited.

LACROIX BROTHERS, paper-makers, Angoulême, and Rue Mazarin, Paris (France, 1636), for the great perfection of their writing papers.

LEIGHTON, J. and J., bookbinders, Brewer Street, London (24), for specimens of good binding in various stages; for the perfection with which they make fac-similes of missing pages to valuable works; and the care and finish which are conspicuous in all they have exhibited.

LEWIS, Mrs., Duke Street, St. James' (163), for excellence in bookbinding.

LORTIC, P. M., bookbinder, 199 Rue St. Honoré, Paris (France, 1652), for the taste and execution displayed in the finish of several works, among which a folio volume, "*Balbus de Janua*," in an illuminated style, deserves particular mention. The firmness of the forwarding throughout the whole series of books exhibited by Mr. Lortic merits high praise.

MAUBAN and VINCENT JOURNET, managers of the Joint Stock Paper-Making Company of the Souche, Vosges, and 5 Rue du Pont de Lodi, Paris (France, 377 and 619), for the general excellence of their printing-papers, and more particularly for the purity of their filtering-paper for chemical purposes, hitherto a great desideratum.

MAME and Co., Tours (France, 321), for the extreme cheapness and great variety of books printed, bound, and published by them. Amongst others, "*Le Paroissien Romain*," 18mo, 636 pages, in Latin and French, neatly printed, with a vignette border to every page, in boards, is published at "one shilling."

MAYER, Madame T. (France, 624), manufacturer of fancy ornaments for confectioners, 22 Rue de la Vieille Monnaie, Paris, for general excellence.

MILIANI, P., Rome (Rome, 12), for the high quality of his hand-made plate and writing papers.

MÖNCH and Co., Offenbach, Grand Duchy of Hesse (Grand Duchy of Hesse, 66), for general excellence in porte-monnaies, pocket-books, and dressing-cases.

MONTGOLFIER, paper manufacturers, Paris (France, 324), for the general excellence of their paper, and for their imitation of parchment, adapted, among a variety of other useful purposes, to gold-beating, instead of the skin usually employed by gold-beaters.

NATIONAL PRINTING OFFICE (France, 544), for the variety of Oriental and other types, and for the beautiful execution of their specimen book, in which great taste is displayed; also for the elegance of the three Oriental volumes—"Le Premier Livre des Rois," the first volume of "*L'Histoire des Mongols*," and the first volume of "*Bhagavata Purana*," with border round every page in gold and colours. The ultramarine blue, printed as an ink, direct from the type, is pure and bright.

NIEDRÉE, J. E., Passage Dauphine, Paris (France, 665), for his beautiful specimens of bookbinding, in which taste, elegant finish, and solidity are combined.

ODENT, SONS, and Co., Courtalin, Seine-et-Marne (France, 938), for general excellence in a variety of papers, and also for their paper called animal parchment.

PALSGRAVE, J. T., Montreal, Canada (Canada, 189), for a large and well-formed collection of printing types, cast at Montreal.

PLON BROTHERS, printers, 36 Rue de Vaugirard, Paris (France, 1395), for superior execution in different descriptions of woodcut and other printing.

RAUCH BROTHERS, paper-makers, Heilbronn, Wurtemberg (Wurtemberg, 44), for the excellence, good colour, and strong sizing of their writing-papers, and for their two-sided veneered opaque papers.

REMANT, EDMONDS, and REMANT, Paternoster Row, London (5), for general excellence in design and workmanship, and novel application of materials in book-binding.

RIVIÈRE, R., bookbinder, Great Queen Street, London (89), for superior workmanship and finish in bookbinding.

THE RUBELAND DUCAL FOUNDRY INSPECTION at Prussia, (780), for specimens of stereotype plates in iron, and for the Bible printed therefrom.

SAUNDERS, T. H., of Dartford, Kent (36), for a novel style of ornamental water-mark on paper, the water-mark giving gradations of shades. It was suggested by Mr. Oklham, of the Bank of England, at whose request Mr. Saunders applied it in the manufacture of paper.

SCHAEUFFELEN, G., paper-maker, Heilbronn, Wurtemberg (Wurtemberg, 41), for the cheapness and good quality of his plate, printing, writing, and tissue papers. The water-mark is said to be put on dry, by a peculiar process, after the paper is made.

SCHLOSS, Widow, & BROTHER, 15, Rue Chapon, Paris (France, 1480), for superiority in a large collection of porte-folios, porte-monnaies, porte-cigars, and other leather articles.

SCHREIBER, J. C. G., paper manufacturer, Merseburg (Prussia, 783), for his enamelled cardboards and paper, and for the general excellence of the various articles exhibited.

SINCLAIR, DUNCAN, and SON, Edinburgh (92), for the general excellence of their specimen of printing types.

SILBERMANN, G., Strasbourg (France, 374), for his specimens of surface printing in colours, and general excellence in the various productions exhibited by him. (Medal awarded in Class XXX.)

SMITH and MEYNIER, Fiume, Austria (Austria, 360), for their specimens of well-made writing-papers.

SOHNÉE BROTHERS, Paris (France, 380), for their superior bookbinders' varnish.

SPICER BROTHERS, wholesale stationers, New Bridge Street, London (42), for their collection of papers, showing the present state of the paper manufacture of England.

STEPHENSON, BLAKE, and Co., type-founders, Sheffield (182), for general excellence.

THOMAS & SONS, Cornhill, London (44), for account-books, combining great solidity and excellence in paper, ruling, and binding.

VARGOUNIN and BROTHERS, paper-makers, St. Petersburg (Russia, 260 and 302), for the excellence of their writing papers.

VENABLES, CHARLES, Clifden and Soho Mills (with 149, Class XVII.), for the superior quality of plate, lithographic, and other printing papers.

VENABLES, WILSON, & TYLER, Queenhithe, London (149), for the assistance they have afforded the Jury by their ample collection of specimens of paper from the principal manufacturers of the United Kingdom, and for the cheapness of the printing papers of their own manufacture.

VENABLES, GEORGE, paper-maker, Cookham Mills, near Maidenhead (with 149, Class XVII.), for the good quality and strength of his wrapping papers, more particularly that which is used for paper bags.

VIEWEG & SON, printers, paper-makers, and type-founders, Brunswick (Prussia, 822), for the great variety of useful publications.

WATERSTON, GEORGE, sealing-wax manufacturer, Edinburgh (93), for the great excellence and brightness of his sealing-wax.

WESTLEYS & Co., bookbinders, Friar Street, London (111), for superior workmanship in the finishing of a folio Bible, in green morocco, illuminated edges.

WESTLEY, J., bookbinder, Playhouse Yard, London (48), for general excellence in bookbinding.

WILLIAMS, J., account-book manufacturer, Bucklersbury (53), for the solidity and superior manufacture of a large ledger with iron back.

WRIGHT, J., bookbinder, Noel Street, Soho, London (139), for beauty of execution in vellum and morocco, in blind-tooling and gold, and for superiority in forwarding.

The Jury desire to make Honourable Mention of the following Exhibitors:—

BANCKS BROTHERS, paper-makers, Chesham (96), for an improvement in the water-mark in paper.

BANKS, SON, & CO., pencil-makers, Keswick, Cumberland (Class I., 69), for black-lead pencils.

BARKER, J., Bexley Heath, Kent (189), for specimens of type-metal casts from wooden matrices, applicable to calico and other printing.

BARRAT, M., Châlons-sur-Marne (France, 1067), for letter-press and lithographic printing.

BATTEN, D., Clapham Common (59), for various specimens of bookbinding.

BATTAGIA, G., Venice (Austria, 366), for some specimens of typography, with simple and convenient binding.

BEMAND, R., parchment-maker, Courtrai, Belgium (Belgium, 478), for various specimens of white and coloured parchment.

BERTHAULT, M., parchment manufacturer, Issoudun (Indre), (France, 56), for specimens of various descriptions of vellum and parchment (Prize Medal awarded in Class XVI.).

BERGE BROTHERS, Offenbach, Grand Duchy of Hesse (Hesse, 60), for cigar cases, leather purses, and other articles of a similar description.

BERGER, C. H., Vienna (Austria, 380), for the great variety of wafers in paper and gelatine.

BONDON, L., 5 Rue Grange-aux-Belles, Impasse St. Opportune, Paris (France, 63), for specimens of enamelled paper.

BRADLEY, B. & Co., bookbinders, Boston, United States (United States, 473), for cloth binding and block gilding.

BRIARD, J. H., Ixelles, Belgium (Belgium, 277), for printed Bibles and Testaments.

CALLAGHAN, Mr., Attorney-General, New South Wales, for a volume printed from types cut and cast in Sydney, and printed by John Rowe.

CUNDALL & ADDEY, booksellers, 21 Old Bond Street (106), for a specimen book-cover, in pierced metal.

DE SERLAY, C. G., paper-maker, Gueurs, Seine-Inférieure (France, 1484), for a variety of tinted papers.

DUFOUR, L., Boulevard Beaumarchais, Paris (France, 483), for specimens of gold, silver, and other fancy papers.

DOPTER, J. V. M., 58 Rue de la Harpe, Paris (France, 1194), for his specimens of lace and other fancy papers.

ENSCHEDÉ & SONS, Haarlem, Netherlands (Netherlands, 79 and 109), for printing types and stereotype plates.

FARINA, A., Turin, Sardinia (Sardinia, 47), for small punches and types.

FLECHÉY, J. B., paper-maker, Algiers (Algiers 24), for cigarette and other papers manufactured from the leaves of the dwarf palm-tree.

FREUND, E. A., Offenbach, Grand Duchy of Hesse (Hesse, 38), for a variety of enamelled cardboards and paper.

GASSETT, H., Boston, United States (United States, 420), for vellum bindings and ruling.

GAUTHIER, junior, 14 Rue de la Parcheminerie, Paris (France, 234), for brass letters for the use of bookbinders.

GILLOT, M., 8 & 10 Rue du Chevalier du Guet, Paris (France, 522), for a new method of etching plates for surface printing.

GLENISSON & VANGENECHTEN, Turnhout, Belgium (Belgium, 286), for cheapness in cardboards, and marbled and surface-coloured papers.

GRAF, H., bookbinder, Altenburg (Prussia, 746), for block gilding on the covers of a large folio altar Bible.

GRANGOIR, J. M. (France, 1256), for locks for pocket-books.

GRUEL, Madame, 10 Rue de la Concorde, Paris (France, 857), for bookbinding with carved ivory and wood, and inlaid morocco, &c.

GUESNU, M., 70 Rue du Temple, Paris (France, 250), for numerous specimens of ornamented paper and stationery.

HAAS & Co., Offenbach, Grand Duchy of Hesse (Hesse, 62), for pocket-books, porte-monnaies, and other leather goods.

HAENLE, L., Munich, Bavaria (Bavaria, 47), for burnished gold and other ornamental papers.

HAËNEL, E., Berlin (Prussia, 284), for various matrices, types, and printing.

HEYL, J. F., & Co., Berlin (Prussia, 44), for transparent wafers.

HIDER, ELIZABETH, 15 Manor Place, King's Road, Chelsea (17), for fancy floral ornaments, as applied to valentines.

HIRSCHFELD, J. B., Leipsic, Saxony (Saxony, 180), for coloured surface printing.

HULOT, A., Hotel des Monnaies, Paris (France, 882), for impressions from relief engraved plates.

JAMAR, A., Brussels (Belgium, 444), for his specimens of illustrated books and for woodcuts.

KING, T. & J. H., Bartlett's Buildings, Holborn Hill, London (22), for their new type music.

KNIGHT & HAWKES, 13 Clerkenwell Green, London (107), for stereotyping.

KOCH, C. A., Gladbach (Prussia, 329), for writing and plate papers.

KÜHN, C., & SONS, Berlin (Prussia, 152), for a collection of portfolios, pocket-books, albums, and porte-monnaies; and also for ruling for account-books.

LEBRUN, L. J., 126 Rue de Grenelle St. Germain, Paris (France, 906), for book-binding.

LEISEGANG, W., bookbinder, Berlin (Prussia, 149), for a specimen of block-gilding on velvet.

LEIGHTON and SON, Harp Alley, Shoe Lane (158), for bookbinding.

LIEPMANN, J., Berlin (Prussia, 147), for an ingenious mode of producing several impressions from a mass of colour in which the various gradations of tint are an inch or more in thickness, and which, on being moistened with oil and subjected to pressure, yields successive copies of the subject represented.

MACOMIE, A., and Co., bookbinders, 6 Percy Street, Bedford Square (26), for their specimens of binding.

McADAMS, J. and W., Boston (United States, 482), for ruling account-books, and for some circular ruling.

MANCHIN and MOREL, 8 Wilson Street, Gray's Inn Road (128), for novelty in the application of bitumen to the purpose of stereotype.

MARTIN, J., London (29), for a new mode of sizing paper, by which it is stated to be rendered waterproof.

MARION, A., stationer, 14 Cité Bergère, Paris (France, 609), for a general assortment of fancy, ornamental, and plain paper and stationery.

MEILLET and PICHOT, Poitiers (France, 629), for their postage and other stamps. They exhibit a paper which they state precludes the possibility of forgery.

MEYER, E., 2 Rue de l'Abbaye, Paris (France, 637), for his specimens of printed designs in fifty colours, from surface-blocks, in imitation of Berlin patterns.

MILLER and RICHARD, letter-founders, Edinburgh (150), for a specimen of ruby type in which "Gray's Elegy" is printed, thirty-two verses in two columns, occupying only three and three-quarter inches in length.

MORELL, H., Fleet Street (Class IV., 58), for wax and wafers.

NÉRAUDEAU, J. A., 16 Rue des Fossés Montmartre, Paris (France, 661), for ledger binding.

OBRY, BERNARD, and Co., Prouzel, near Amiens (France, 334), for black and other papers.

PIETTE, L., paper-maker, Dillingen (Prussia, 394), for various papers.

PINCHES and Co., 27 Oxendon Street, London (33), for specimens of stamping in relief on envelopes and writing-paper.

PIQUES, —, Velars-sur-Ouche, Côte d'Or (France, 1393), for pasteboards.

REHBACH, J. J., Regensburg, Bavaria (Bavaria, 82), for black-lead pencils.

REICHOLD, G., Stuttgart, Wurtemberg (Wurtemberg, 39), for fancy leather goods, porte-monnaies, &c.

REEGER, H. J. Rotterdam (Netherlands, 112), for bookbinding.

RÉVILLION, letter-founder, St. Petersburg (Russia, 361), for a specimen of printing, and also for his Greek, Oriental, and other types.

ROMETSCH, C., Stuttgart, Wurtemberg (Wurtemberg, 73), for a substitute for writing slates.

ROYSTON and BROWN, Old Broad Street, London (34), for ledgers and other account-books.

SCHÜLL, L., paper-maker, Duren (Prussia, 393), for white and tinted papers.

SIBELL and MOTT, New York (United States, 339), for their specimens of account-books.

SIMIER, J., 38, Rue de l'Arbre Sec (France, 693), for bookbinding.

STARKE and Co., Montreal, Canada (Canada, 191), for specimens of ornamental printing.

STAER, C., New York (United States, 88), for binding works for the blind, with thickened margins to prevent the embossing from being pressed out. The specimens exhibited are said to have been bound by the machines, No. 88, United States Department.

TURNBULL, J. L. & J., Holywell Mount, Shoreditch, London (45), for drawing boards.

VANDERDORPEL & SON, 3 Rue Chapon, Paris (France, 712), for various articles of fancy stationery.

VINCENT and TISSERANT, 21 Rue Michel le Comte, Paris (France, 730), for sealing-wax, fancy wafers, and writing inks.

WALKER, E. and Co., New York (United States, 123), for a Bible elaborately bound and ornamented, with a recess for a family register inside the covers.

WATERLOW and SONS, 66, London Wall (46), for specimens of account books.

WEBER, J. B., Offenbach, Grand Duchy of Hesse (Grand Duchy of Hesse, 43), for specimens of marbled papers.

WODDESPON, J., Portugal Street, Lincoln's Inn Fields, London (159), for improvements in ledger binding, by the introduction of patent vellum cloth bands.

WOLFF, E. and SON, pencil manufacturers, 23, Church Street, Spitalfields, London (Class I., No. 68), for crayons and pencils.

MONEY AWARDS.

The Jury have awarded the sum of 10*l.* each to the undermentioned workmen, as the most appropriate recognition of their skill and taste.

BUDDEN, E., bookbinder, Cambridge, exhibitor (97). The workman who bound an album, elaborately ornamented, in which taste and good work were displayed.

NEIL, R., journeyman bookbinder, North Bank Street, Edinburgh (91), for the care, industry, and perseverance displayed in binding an imperial 4*to* Bible in cream morocco, under great disadvantages. The work was executed at his own home, after his daily occupation, by gaslight, in the winter; and notwithstanding these difficulties, a degree of excellence was attained.

A. FIRMIN DIDOT, *Joint Reporter.*

C. WHITTINGHAM, *Reporter.*

T. DE LA RUE, *Joint Reporter.*

London, March 1852.

CLASS XVIII.

REPORT ON WOVEN, SPUN, FELTED AND LAID FABRICS, WHEN
SHOWN AS SPECIMENS OF PRINTING OR DYEING.*Jury.*

HENRY TUCKER, *Chairman*, 30 Gresham Street; Silk Manufacturer.

J. PERSOZ, *Deputy Chairman*, France; Professor of Chemistry at Paris; Member of Central Jury.

EDMUND POTTER, *Reporter*, Manchester; Calico Printer.

J. M. BEEBE, United States.

E. E. CHEVREUL, France; Member of the Institute; Professor and Director to the Museum of Natural History.

JOHN HARGREAVES, Accrington, Lancashire; Calico Printer.

ALEXANDER HARVEY, Glasgow; Dyer.

HENRY PAHUD,* Switzerland; Merchant.

C. SWAINLAND, Crayford, Kent; Printer.

Dr. W. SCHWAB, Austria; Board of Trade, Vienna.

* CHARLES BOVET, Proxy for Mr. Pahud

Associate Jurors.

— MARNAS, Lyons, France.

SAMUEL SMITH, Bradford.

THE Jury of Class XVIII., in accordance with their instructions, report as follows on the various specimens of printed goods placed in the Exhibition, the whole of which they have carefully and minutely examined. The productions of the English and Scotch printers came first under their observation. Ireland has now only one or two small print-works: she had some rather extensive ones within the last twenty years, but during that time they have been gradually closed. Before remarking on the present productions of the English and Scotch printers, the Jury can hardly help referring to the changes in the trade within the last-named period, dating from the repeal in the spring of 1831 of the very heavy duty on printed cottons. The entire production of the trade in England and Scotland (Ireland paid no duty for home-consumption) was then, as shown by Parliamentary returns, rather more than eight million pieces per annum. The reduction of a duty amounting on the average to fifty per cent. gave an immediate impulse to the trade, and within ten years from that date it appears that the production of Great Britain was doubled. Since that period no materials exist which afford sufficient data for an accurate account of its progress; but it is calculated that the trade which, in 1830, produced eight million pieces per annum, now probably produces not less than twenty millions yearly. Great changes in style and taste would necessarily be consequent upon such an increase in quantity. Very great improvements have been effected in the material printed upon. The regularity and evenness of fabric, in calicos made by the power-loom, of all

qualities down to the very cheapest, give the English printer a fabric for the use of the middle classes, which places him decidedly above the competition of the whole world in this most essential branch of his trade.

The impulse given to the trade, followed perhaps by excess of supply and strong competition, caused a great reduction in price. To meet this, machine-work was generally substituted for block-printing. The engraver was stimulated (here, too, machinery lent its aid), chemical discovery (English and foreign) was not wanting, and the result was a large and cheap supply, chiefly of fine class plate-work, beautifully and exactly executed; or in one, two, three, or four colours, in permanent madder-work; as well as in a larger number of colours, printed at once in more showy and fugitive steam-colours.

These changes led to the encouragement of a less showy taste than that for chintz block productions, and to a preference for goods of a more elegant and quiet character. Some of the staple productions, such as the navy-blue print, largely consumed for domestic wear throughout the country, almost entirely disappeared, being superseded by the very general use of the purple madder prints.

It should be observed that at this date the English printer borrowed extensively from the style of his French competitors. The printers of the then called Swiss prints (really French goods, produced in Alsace) were unrivalled in their pink and purple machine work. These articles, even for years afterwards, were imitated successfully by a few only of the first-class English printers; whereas now the progress of the trade in scientific knowledge, so patent to all, has enabled almost every printer in England and Scotland to produce them more or less successfully.

These goods, which were exported by the French, and met with in almost every capital city of the world, are now supplied in much larger quantities by the English printer, and to them has been added the supply of a new and increased variety of lower-priced prints of a similar class. It is an interesting and curious fact, that the taste in almost every market has changed and improved with the reduction of price.

The English printer has also drawn largely upon his French rival during the same period, for another trade which he has likewise, by the aid of the manufacturer and his machinery, done much to make his own. France has long been famous for her beautiful fabrics in fine wool, in wool and silk challés, and in delaines. These expensive and costly goods, made of the finest wool, and requiring great care in execution, have been produced with a taste in colouring and design, worthy of the beauty and elegance of the material. With them, France supplied and led the taste of all the civilized markets of the world. An article so costly was naturally of limited demand. The capital and machinery of the English printer have, then, been brought to bear on this branch of the business. Cotton has been introduced into the fabric, and a beautiful substitute, at a low price, replaces the more costly all-wool material of our neighbours; thus obtaining the desired cheapness and beauty. Block-printing on this material (the English wool and cotton-de-laine) was for some time the only mode adopted; but machinery has since been adapted to it; and the English printer now offers it at a low price, in every market, and creates a demand which the high-priced one would never have known. The cheaper article has brought with it no corresponding

declension in taste: quite the contrary, the greater demand, and the increased power of execution obtained by machinery, have led to various novelties in style.

The English printers have naturally exhibited such articles as they thought would look best in an Exhibition, and be best appreciated by the public. This in a great degree accounts for the absence of the large variety of those cheaper printed goods, which form after all the great bulk of the English print trade—the staple one, by which she commands almost exclusively all neutral markets, and maintains her position for superiority and cheapness of produce.

Some opinion will be expected from the Jury, as to the causes of superiority in the *finer* classes of French goods.

England received the art of calico-printing from France, at the end of the seventeenth century, derived previously by the latter from Central Germany, which had been for some time the seat of the art, originally obtained from Egypt and the East. The trade was first introduced into the neighbourhood of London; but after a period of about sixty or seventy years it gradually decreased there, and yielded to the competition from the then newly-established works in Lancashire, which were aided by cheaper fuel and labour. These assumed an importance as they extended themselves, in printing on the newly-discovered fabric of cotton calico, just becoming the staple manufacture of that county. A few print-works yet remain in the neighbourhood of London, employed chiefly on very fine shawl and silk-handkerchief printing. The English printer, encouraged by his abundance of fuel, cheap labour, and facility for obtaining the largest supply of calico, has naturally fostered a trade suited to his machinery and capital, which is a complete contrast to the very different class best suiting the French printer to produce. The more limited and costly branch of the trade has naturally found its chief market in France. Paris has ever led the fashion of the world in female dress, and fashion has only a remote influence on inferior classes of goods. France is well supplied with cheap and skilful hands, well practised in the manipulation of fine and delicate fabrics upon which machinery cannot so well be brought to bear—in some measure perhaps because the demand does not repay a large outlay. Singularly enough, that country having the superiority in production in fine goods, possesses also an advantage over the British printer in demand, having our market *free* for her goods, whilst the English is prohibited from hers, and is denied the advantage of manufacturing for French taste and consumption.

The French, in proportion to their productions, supply much more largely for the highest class—a class, be it remembered, influenced by fashion, eager for novelty, and tempted by variety. The English supply, in proportion to their production, much more largely for the wear of the middle and lower class all over the world, many of whom have conventional and national peculiarities of garb not easily affected by novelty. Hence arises the very natural distinction between the tastes of the two nations. It will be admitted, perhaps, that in every article owning the influence of taste, much greater advance has been made of late in the productions suited for the use of middle-class consumption, and upon which the beautiful accuracy of mechanical skill has been brought to bear, than in the higher class of goods, in which manual labour is still chiefly used. The blocked muslin of to-day is no better in taste, and but little so in execution, than the specimens of a hundred years ago.

Without referring to the samples shown by any particular British Exhibitor, the Jury consider that there are to be found amongst them very fine specimens of work and taste in barèges, in woollen fabrics of different kinds, and in muslin goods,—very good first-class work in blocked de-laine goods (the woollen and cotton fabric), equalling, perhaps, in brilliancy of colour, any specimens (either of British or foreign goods) printed on wool alone, showing a triumph of art justly due to the English printer, viz., the giving an equally sound colour on a mixed fabric, composed of vegetable and animal substances. Choice specimens of machine-work on de-laine, in four, five, and six colours, are shown in some of the collections,—various assortments of the staple calico print trade, in madder-work, permanent and bright in colour, together with specimens of garancine dyed goods, in variety of machine work, all displaying considerable advance in taste, neatness of pattern, and execution; being fine specimens both of engraving and printing, and well representing the regular and standard productions of the houses exhibiting them. In the lower class of cheap machine-work, though an equally valuable branch of manufacture as supplying a most extensive trade, both for home and export, the Jury regret (owing to reasons they have before assigned) that no specimens are exhibited.

Some few good samples of English furniture-prints are shown. Perhaps it may be affirmed that this is a decreasing trade (except in very low goods for export, of which there are no specimens); and that woven damasks of considerable beauty, and comparatively cheap in price, have in some degree superseded the use of calico printed furniture.

A fact indicating the change in the English print-trade, before alluded to, may here be noted as further corroborating its progress in chemical science and machinery within the last twenty years. It will be admitted by the older members of the trade, that had there been an Exhibition in 1831 of English prints, it would have consisted chiefly of fine first-class blocked madder-work, and been confined to the productions of a few printers, who at that time stood far in advance of their brethren. In 1851, the Exhibition shows scarcely a specimen of block-work on calico, but a great variety of ingenious machine-work by a number of first-class printers.

Special reference is made to the variety of specimens of Turkey-red printed and dyed fabrics, in the English, French, and almost all the continental assortments. Originally, as the name implies, it was a Turkish red, produced at Adrianople. Its brilliant and permanent colour secures for it a steady consumption in many markets, and a high average of excellence is shown in its production.

Another branch of the print trade, which has its chief seat in the neighbourhood of London, though also pursued in Lancashire, Cheshire, and Scotland, is that of printed silk handkerchiefs. This, too, is originally of eastern origin, and is still an article of considerable import, both in the Corah cloth (the grey for printing upon), and in the finished printed Choppah and dyed Bandanna. Great changes have taken place in the relative imports: that of the printed handkerchief having gradually decreased in the last sixteen years to about one-fifth, whilst the import of the Corah has nearly trebled, an equal quality of the same description of cloth, and also an inferior one, being largely made in England—showing in this article, also, a progressively-increasing print manufacture.

This trade has been carried on for some years in Germany; but that country consumes chiefly English goods. France, too, within the last few years, has striven to establish a trade in printing these goods, and has made some progress in the inferior descriptions: previously she was indebted to this country (from which she still continues to import) for them. Selections are shown in the British department, excellent alike in fabric and execution, and embracing every variety of style in a trade demanding a regular supply, from the old imitation oriental colouring and patterns, to the fancy picture handkerchief, delineating in the present instance, as its latest novelty, variously-tinted representations of the Crystal Palace.

The remarks of the Jury on the English print-trade naturally include so many references to the state of the French, as to limit very materially the separate notice which, from its importance, the latter demands.

The Jury have alluded to the high excellence shown in the finer goods of France. The absence of all middle and lower-class French prints in the Exhibition, in fact of any specimens of the productions of the city of Rouen, is remarkable, as confirming the views already expressed. The French printer has not the advantage of cheap and well-made calico: he is debarred by cost from the advantages of extended foreign markets.

The Jury refer with pleasure to the contributions made by the French printers to the Exhibition, and commend the superior taste with which they are arranged—a taste doubtless improved by the experience they have acquired at the periodical French Exhibitions.

The character of the French goods, of course, differs from that of the English, as, being more confined to the expensive class, the taste is necessarily of a higher order, and therefore presents a display more striking to the general observer. The Jury refer especially to the very fine printed furnitures, exquisite alike in taste and execution, to some very beautiful dresses of difficult and elaborate block-work on all-woollen fabrics, and to the general assortment of finer cotton prints, varying in some degree from similar English prints of the same class, because produced on finer and more costly cloth. Here, as in the English department, the entire absence of all lower-class goods, suitable for the wear of the artizan and peasant, is to be regretted.

The Jury notice beautiful specimens of *yarn printed silks*, printed on the warp thread before weaving—an article among the finer silk goods which is well adapted for displaying that beautiful arrangement of colour and design, for which France is so justly celebrated. One or two specimens of printed silk handkerchiefs are shown, more especially referred to in the report on English goods of the same class.

Some statistical remarks on the progress of the French print-trade would have been introduced here, but the Jury regret that they have not been able to obtain any official information on the subject. Holding the first rank in taste, and second in amount of production, of the European nations, the progress and state of the French trade must form an interesting subject of inquiry.

The Jury would next allude to the interesting contributions from Switzerland, presenting excellent specimens of muslin and calico work, block and machine, some of them unsurpassed in execution by any in the Exhibition. They are

specially worthy of notice as the manufactures of a country which first ventured to rely upon natural protection alone. Till within the last twelve months, Switzerland had no duties on imported prints; latterly, however, she has imposed a small fiscal one of about 2½ per cent. There is reason to believe that the houses producing these goods have successfully introduced them, for years past, in competition with French and English, into various neighbouring markets in Central Europe.

The printed goods from Russia, Prussia, Austria, the Zollverein, Hamburg, Sardinia, Portugal, Turkey, and the United States of America, exhibit fewer varieties of production, of unequal merit, and each prepared chiefly for their respective markets.

The Egyptian contribution of printed goods is curious, as presenting nearly the rudest modern manufactures, the products of English machinery and partly of English workmen; exhibiting the germs of the revival of a trade in a country, which certainly possessed the art of printing and dyeing mordanted colours 1800 years ago.

The last and most inferior specimens of printing are those of Central India, exhibited by the East India Company. They deserve attention as the productions of a country the most ancient in the history of the print-trade, and which, 130 years ago, contributed nearly all the fine printed chintzes then worn by the higher classes, which so much superseded the use of other fabrics, as to excite a popular feeling against them and all printed goods; so that the Government of the day, yielding to the clamour, actually passed an Act through Parliament, prohibiting the wear of all printed calicos whatever,—an Act which disgraced the statute-book for ten years.

One fact, highly creditable to the character of the Exhibition, and the Exhibitors of printed fabrics, the Jury would wish to state. They believe that amongst the variety of British and foreign printed goods, there are not to be found any specimens prepared specially for the Exhibition, or for show merely, but only such selections from the work of each house as honestly represent its average produce.

The decisions of the Jury, on the merits of the articles exhibited, have been arrived at from a consideration of the wants of the consumer alone, always remembering that it is his taste in its highest form, and not any critical standard, which it is necessary for the printer to consult and supply. The chief object of the Exhibition is to bring together the finest articles already produced, and by presenting these side by side for comparison, to suggest new forms and varieties, and to induce an increased demand from various countries.

In their report on the specimens of dyed goods placed before them, the Jury would remark, first, on those of Great Britain (India included).

Here will be found dyed woollen articles, as well as numerous specimens of mixed fabrics (woollen and cotton, woollen and linen) in piece-goods of great variety and purity of colour. Specimens of silk and wool in the hank, equally diversified in colour and in gradation of shade. The silks used in the manufactures of Spitalfields, Macclesfield, Manchester, Coventry, &c. The wools for the manufacture of carpets and woollen and mixed fabrics, in Kidderminster, Glasgow, Bradford, Leeds, Halifax, Norwich, and elsewhere.

The French collection of dyed goods presents a beautiful variety of merinos, but none of mixed cotton and woollen fabrics. Varieties of dyed wools for the manufacture of Parisian shawls, and of silk in the hank, showing that purity of colour, especially in the lighter shades, which contributes so greatly to the success of the Lyonese manufactures.

Saxony, Prussia, Austria, and Russia, have sent many varieties of dyed yarns.

In their respective compartments will be found the merinos of Saxony and Russia.

Numberless varieties of woollen dyed yarns for the Berlin carpets; and from Vienna, for the manufacture of shawls and damasks.

Switzerland exhibits numerous specimens of the dyed silk used in the extensive manufactures of Bâle and Zurich.

China, one of the earliest known silk manufacturing nations of the world, is represented on this occasion by a complete assortment of the dyed silks used in her manufactures.

Having briefly referred to the specimens of dyeing, it may be remarked that this art has participated in the great industrial movement of the last twenty-five years; and of this, the dyeing of mixed fabrics composed of animal and vegetable substances affords a striking proof. The great difficulty of presenting a bright, sound, and uniform colour, on fibres having different affinities, has been overcome. In the various modes of dyeing silk and wool, Prussian-blue, with a tin mordant, has been substituted for indigo with complete success. The colours extracted from various dye-woods, have, by a judicious application of oxidizing agents, been rendered brighter and more permanent. Preparations of tin, formerly employed for fine colours only, are now in general use, and furnish the means of multiplying the shades of bright and permanent colours.

Particular reference ought to be made to the great improvement in the bleaching or whitening the silk fibre intended for the dye-bath. It is well known that the paler shades of colour cannot be produced bright and clear unless on a silk of pure white.

In presenting a list of the names of Exhibitors to whom the Jury award the Prize Medal, in woven, spun, felted, and laid fabrics, when shown as specimens of printing or dyeing, it appears inexpedient to mention, otherwise than in general terms, the points of excellence upon which these awards are founded.

The greater number of Exhibitors show specimens of printing on a variety of cotton, woollen, and mixed fabrics: reference however is made to those only which appear most remarkable.

In printing.—The Prize Medal is awarded for various degrees of excellence, in design, execution, and brilliancy or permanency of colour, or both.

In dyeing.—The Prize Medal is awarded for brilliancy, permanency, and uniformity of colour.—The Jury make these awards to printers and dyers only.

PRINTING.

The Jury award Prize Medals in this department to the following Exhibitors:—

BERNOVILLE, LABONNIER, and CHENEST, Paris, (1548, France,) for fancy fabrics printed in steam colours for dresses.

BLACK, JAMES, and Co., Glasgow, (51,) for printed muslins, jaconots, and fancy fabrics.

BLECH, STEINBACH, and MANTZ, Mulhouse, (29, France,) for printed mousseline-de-laines (all wool), calicos and jaconots, in madder colours.

BOCKMÜHL BROTHERS, SCHLIEPER, and HECKER, Elberfeld (606, Prussia), for printed calicos.

BOSSI, J., St. Veit, near Vienna, (239, Austria,) for fancy fabrics printed in steam colours for dresses.

CHOCQUEEL, LOUIS, Labriche, (90, France,) for fancy fabrics printed in steam colours for dresses.

DALGLEISH, FALCONER, and Co., Glasgow and Manchester, (27,) for machine-printed calicos.

DE LA MORENIÈRE, GONIN, and MICHELET, Paris, (1583, France,) for fancy fabrics printed in steam colours for dresses.

DOLLFUS, MIEG, and Co., Mulhouse, (1191, France,) for printed muslins and jaconots, madder and other colours; printed mousseline-de-laines (all wool).

EVANS, DAVID, and Co., London, (1,) for printed silk handkerchiefs, and printed table-covers.

GODEFROY, L., Pateaux (Seine), (1252, France,) for fancy fabrics printed in steam colours for dresses.

GROS ODIER, ROMAN, and Co., Wesserling, (248, France,) for printed muslins and jaconots in madder and other colours; and printed mousseline-de-laines (all wool).

HARTMANN and SON, Munster (Haut-Rhin), (256, France,) for various fabrics printed in madder colours.

HOYLE, THOMAS, and SONS, Manchester, (36,) for machine-printed calicos.

INGLIS and WAKEFIELD, Glasgow, (4,) for machine-printed mousseline-de-laines and barèges.

JAPUIS, J. B., and SONS, Claye, (274, France,) for printed cottons and chintz colours for furnitures.

KGECHLIN BROTHERS, Mulhouse, (1634, France,) for printed mousseline-de-laines (all wool), printed calicos, in madder colours.

LEITENBERGER, FRANZ, Cosmanos, Bohemia, (187, Austria,) for printed calicos, in madder colours.

LITTLER, MARY ANN, Merton Abbey, (8, as exhibited by Mr. Wilkinson; and 282, Class 12 and 15,) for printed silk handkerchiefs.

SALE, J. N., Manchester, (39,) for printed cotton shirtings.

SCHLUMBERGER, jun., and Co., Haut-Rhin, (1481, France,) for calicos and jaconots printed by cylinder.

SCHWABE and Co., Manchester, (41,) for printed calicos, madder, and garancine work.

SCHWARTZ and HUGUENIN, Mulhouse, Haut-Rhin, (1003, France,) for printed cotton chintz colours for furnitures.

SIMPSON and YOUNG, Manchester, (47,) for mousseline-de-laines (cotton warps), printed by cylinder in six and seven colours; and calicos printed in steam colours.

STEINER, C., Ribeauvillé, (383, France,) for Turkey red, plain dye and printed.

STEINER, T. & Co., Church, near Accrington, (37,) for Turkey red, plain dye and printed.

THOMSON BROTHERS, and SONS, Manchester, (25,) for printed mousseline-de-laines (cotton warps).

VAUCHER, DU PASQUIER, and Co., Cortaillod, (36, Switzerland,) for calicos and jaconots printed by cylinder.

WELCH, MARGETSON, and Co., London, (7,) for printed silk handkerchiefs.

WELCH, THOMAS, Merton Abbey, (18,) for printed table-covers.

ZIEGLER and Co., Winterthur, (146, Switzerland,) for plain Turkey red dye.

DYEING.

The Jury award Prize Medals to the following Exhibitors in this department :—

ARMITAGE, G. and Co., Bradford, (146, Class 12 and 15,) for Orleans and Cobourg cloths, mixed of cotton and wool.

BERGMANN and Co., Berlin, (106, Prussia,) for Berlin woollen yarns, dyed in various colours.

FÉAU-BÉCHAUD, V. A., Passy-près-Paris (Seine), (198, France,) for skein-dyed fine woollen yarns for shawls.

FRANCILLON, —, Paris, for merinos, exhibited by Paturle-Lupin, Seydoux, Sieber, and Co., manufacturers, Couteau (1381, France).

GUINON, A. P., Lyons, (1263, France,) for skein-dyed silk in various colours ; bleaching silk and the application of picric acid.

HOWE, J. and Co., Coventry, (36, Class 4,) for skein-dyed silk in various colours.

LE LIEVRE, H. London, (60,) for skein-dyed black silk.

PARTRIDGE, N., Stroud, (212, Class 12 and 15,) for dyeing broad cloths of different colours on each side.

RIPLEY and SONS, Bradford, Yorkshire, (148, Class 12 and 15,) for Orleans and Cobourg cloths, mixed of cotton and wool.

VERSIÈRE, A., Puteaux, near Paris, (720, France,) for merinos.

WEGNER, T. R., Bâle, (155, Switzerland,) for skein-dyed silk in various colours.

The Jury award the Prize Medal to Mr. JOHN MERCER, Accrington (48), for the beautiful application of a scientific principle in preparing various textile fabrics, strengthening the material, and at the same time wonderfully increasing the brilliancy and intensity of the colour when dyed or printed. The results are exhibited in the goods shown by Mr. Mercer. A Council Medal has been awarded in Class II.

The Jury would have felt it a duty to recommend this inventor for the Council Medal, if his discovery had been extensively applied in manufacture.

EDMUND POTTER, *Reporter.*

June 1851.

CLASS XIX.

REPORT ON TAPESTRY, INCLUDING CARPETS, FLOOR-CLOTHS, &c.
LACE, FANCY EMBROIDERY, AND INDUSTRIAL WORKS.

Jury.

DR. POMPEIUS BOLLEY, *Chairman*, Switzerland, Commissioner.

PETER GRAHAM, *Deputy Chairman*, 37 Oxford Street; Carpet Manufacturer.

RICHARD BIRKIN, *Reporter*, Nottingham; Lace Manufacturer.

D. BIDDLE, 81 Oxford Street; Laceman.

ANTONY FESSLER, Switzerland.

THOMAS SIMCOX LEA, J.P., Antley Hall, Stourport; retired Carpet Manufacturer.

ROBERT LINDSAY, Belfast; Sewed and Embroidered Muslin Manufacturer.

FRANÇOIS A. WASHER, Belgium; Merchant at Brussels.

M. ELLIENX, Frankfort-on-the-Maine; Merchant. (Proxy for M. Falk, Zollverein; Manufacturer.)

FELIX AUBRAY, Paris; Merchant. (Proxy for M. Lainel, France; Inspector of Manufactures; Member of Central Jury.)

THE Jury appointed by the Royal Commissioners for Class XIX. having completed their inspection of the various articles, and awarded the prizes placed at their disposal, beg to append to their awards some facts and observations relative to the rise, progress, and present condition of the branches of industry that have come more immediately under their notice.

The Jury are of opinion that the products included in Class XIX., from many countries, are more numerous and various, and differ more widely in price than those comprised in any other Class. Their task has consequently been one of much labour and difficulty, having occupied two months of unceasing attention in seeking out and examining everything said to belong to this Class (the goods from foreign countries not being classified in the Catalogue), and in many cases having to seek for them in other Classes, being most anxious that no omission on their part should be made, and that ample justice should be done to the exhibitors.

The great variety of products before referred to will account for what may at first sight appear too great a degree of liberality in the awards.

In deciding upon the merits of the articles exhibited, they have taken into consideration novelty of invention, novelty and beauty of design, excellence of manufacture or execution, cheapness, durability, and usefulness.

They have recompensed those exhibitors who have displayed one or other of those qualities by Honourable Mention, and have awarded Medals to those who, in their productions, have combined several of them.

The Council of Chairmen having confirmed the recommendation of a Council Medal in the case where the fabric was new, and of great beauty and utility, but not in those cases where great beauty of design was united with the highest degree of excellence in execution, and applied to articles of commercial importance; the names of those exhibitors whose productions were peculiarly distinguished are referred to in the Report.

Having made these preliminary remarks, the Jury proceed with their observations upon the various branches of industry that have come under their notice.

BRITISH LACE.

Bobbin-Net Machinery.—Nottingham, long celebrated for her machine-made lace, has, on this occasion, furnished indubitable proofs that her manufacturers and artizans have been progressing in the same ratio as those in most other branches of industry, during the last half-century. Fifty years ago, lace made by machinery was mostly from the point-net and warp machines (both modifications of the original stocking-frame); since that period, there have been incredible sums of money expended, many valuable lives sacrificed by intense study, hundreds of patents taken out, and nearly as many differently-constructed machines built for the production of plain and ornamental lace of every description. It has been matter of astonishment to see how quickly one inventor has succeeded another, and by simplifying or modifying his machines, rendered useless those of his predecessor. It may be stated, that in none of the textile fabrics have there been so many combinations of machinery used to effect the purpose as in the making of lace, commencing with the stocking-frame, to which was added a Tickler machine, then the point-net machine, warp machine, Mechlin plait machine, and many others. All of these (except the warp machine), disappeared for the purpose of making lace when the bobbin-net machine was introduced, and its capabilities for making both plain and ornamental lace became developed. The bobbin-net machine is so called from the thread that makes the lace being partly supplied from bobbins, and partly from a warp, the bobbins being made to pass from front to back, and back to front, while a lateral motion is imparted to the warp threads, thus causing one series of threads to wrap round the other. After innumerable attempts to make bobbin-lace, the first successful machine was made and patented by John Heathcoat, in 1809. This machine, although novel in its construction, and the first enabling one series of threads to pass round the other, was complex in its arrangements, and required sixty motions to complete one hole, the same being now made with six. The cost, also, of the production was such as to circumscribe its use, for we find in 1815, when the machines of this description had increased to 140, one square yard of the produce was worth 30s.; the same quantity can now be purchased for *threepence*.

But so rapidly, from this period, did the machinery increase and trade extend, that in 1831 the capital employed in the bobbin-net trade, from careful inquiries made by a townsman, W. Felkin, Esq., was 2,310,000*l.*, giving permanent employment to 211,000 persons. It is desirable to state that, up to this time, little else than plain net and quillings had been produced by the bobbin-net machine. After repeated efforts on the Leaver, circular, pusher, and traverse warp machines,

in 1831 and 1832, plans were adopted to purl and bullet-hole the edges of narrow laces, finishing them afterwards with a gimp-thread with the needle; the same was done on the pusher machine, and shortly after on the circular. The rapidity with which new articles were brought out, first by one machine and then by another, was astonishing, each discovery leading the way to something more novel. At this period, also, a patent was taken out by William Sneath, of Hyson Green, and sold to James Fisher, Esq., of Radford, for spotting on the circular machine; soon after another was taken out by Mr. Freeman, of Tewkesbury, for spotting on the traverse warp; and shortly after a third by R. Birkin, of Basford, for the same thing on the Leaver machine.

Many efforts were made by Draper, and others, to apply the Jacquard machine to the bobbin-net for the purpose of ornament. Several patents had been taken out for this purpose, but no successful arrangement had been effected till about 1839, when a pusher machine was worked with cards the width of the net, by Mr. Wright, of Radford: the same application was made to the circular machine by Mr. Crofts, who has taken out several patents for various improvements in nearly every description of bobbin-net machinery.

The application of the Jacquard still progressed slowly till 1841, when a plan discovered by Hooton Deverill was bought and patented by Messrs. Biddle and Birkin, for applying the Jacquard to the guide bars; and so rapid has been the application of the Jacquard since that period, that at the present time there is scarcely a machine at work without it (except those adapted purposely for plain net), either applied to the bars, or along the width of the machine, and from that period the trade commenced anew, producing every description of pattern on all the various descriptions of net known, particularly on the plait-net, that had been made and patented in 1838 by Mr. Crofts, but was not extensively manufactured till the successful application of the Jacquard. Such an impetus did the trade receive from this, that hundreds of machines which were useless, or "worked up," as the trade termed them, were brought into active and profitable use; many of their owners, after spending from 80*l.* to 100*l.*, being able to realize this outlay in three or four weeks (if put on with a saleable pattern). No sooner was the Jacquard machine successfully adapted to the bobbin-net machine, than new sources of manufacture gradually developed themselves, such as flouncings, scarfs, shawls, window-curtains, &c., &c.; but, to succeed in these articles, tasteful and elaborate patterns were required, equal to the French and other foreign productions of the same kind: manufacturers had in many instances to resort to those places for designs. This want of clever local designers caused the same anxiety to be manifested by the makers of machine-made lace that other manufacturing districts had evinced; and the same cordial assistance from the Government was afforded in establishing a school of design in Nottingham.

Though many for the first two or three years thought this school comparatively useless, it has proved that it was only sowing the seeds for extended usefulness, as several young men, that have had no other means of learning designing, and creating a taste for the fine arts, are now filling important situations and receiving liberal salaries; and there is no doubt that at the present time our local artists are capable of producing designs equal to the French, Swiss, &c.

We may be told, the display of lace goods in the Great Exhibition does not

demonstrate this statement; but it must be borne in mind that the manufacturer of machine-made lace has to have his patterns adapted to suit the various markets; and they know from experience, that patterns that would suit the French would not be saleable to any large extent in the English market (and English-made lace being prohibited in the French market, it is useless to adapt our patterns to their taste). In fact, there requires one style for the London market, another for the provinces; one for North America, a different one for South America, and so of all the various markets to which we export our produce.

It will, therefore, be perceived, that the French are rarely employed in designing, except for the Parisian taste, where our designers have to suit the tastes of nearly all the markets in the world.

Judging, therefore, from the beautiful patterns now produced, their suitability to the markets for which they are specially designed, and the rapid manner in which this part of the trade has extended, we think it right to state here that the Government School of Design has materially assisted the enterprising manufacturer and artisan.

At the present time, amongst the infinite variety of articles manufactured by the bobbin-net machines, are—

1st. Black silk piece net ornamented, shawls, scarfs, flounces, trimming laces, blondes in white and colours, some wholly finished on the machines, others partly by machinery, and embroidered afterwards.

(Up to 1845, Saxony exported largely the lower class of these, and France the more expensive into this country; but so perfect are they made, so much improved in design, so effective for useful purposes, and lower by from 75 to 90 per cent. than the class of hand-made articles they represent, that we not only supply our home market, but have exported 150,000*l.* worth annually, during the last four years, to foreign markets, principally the American, and not a few find their way into France, although wholly prohibited by that country.)

2nd. Cotton edgings, laces and insertions, linen laces in imitation of white pillow-lace, muslin edging and laces, fancy piece net, spotted net, plait net, in imitation of the costly Valenciennes lace.

3rd. The third class is of curtains in imitation of the Swiss curtains, bed-covers, and blinds; and although this branch of trade is new, having only been introduced in 1846, yet from the extent it has already attained, employing above 100 machines, and from the display of goods exhibited, excellent in design, and good in texture, it promises not only to be an important but an improving department of the lace trade.

4th. The fourth class includes silk and cotton, plain net Mechlin grounds, blonde, Brussels, or extra twist: this is a branch of much importance, employing regularly upwards of 2,000 machines; one owner, J. Heathcoat, Esq., M.P., having 300, principally making silk net, or Paris blonde. To this gentleman the trade owes much for his zeal and perseverance in discovering the method of imparting that dress or finish to his nets, formerly known only to the French, and the accomplishment of which is now giving permanent employment to many thousands of workpeople.

The numerous and various specimens of Nottingham manufactures in the Great Exhibition, their generally useful character and extraordinary cheapness, com-

bined with very considerable taste in design, and excellence in execution, must tend to still further develop the ingenuity and extend the trade of the locality.

The description of machines at present in use are the following :—

1st. The "*Leavers*," so called after John Leavers, the original constructor of this machine ; a specimen of which, belonging to Mr. Birkin, of Nottingham, is at work in the Exhibition.

Most of the articles included in the first and second class productions are made from this description of machinery.

2nd. The "*Pusher*" machine, so called from having independent pushers to propel the bobbins and carriages from front to back, instead of pulling or hooking them, as in other arrangements.

From this description of machine are made shawls, scarfs, flounces, &c., of a superior quality, which require to have the pattern traced afterwards with a thick thread by women.

3rd. The "*Circular*," so called from bolts or combs on which the carriages pass being made circular, instead of straight, as in the straight-bolt machines, originally constructed by Mr. Morley, of Derby (late of Nottingham). From these machines are made the curtains mentioned in Class III., and the various descriptions of plain, spotted, and fancy nets.

4th. A few "*Traverse Warp Machines*," so called from the warp "traversing" instead of the carriages, as in the circular and pusher machines. These machines principally make spotted lace, blonde edgings, and imitation thread laces.

There is a smaller number of machines now than in 1836, owing to many of the old narrow ones having been broken up and replaced by others, wider, more speedy, and of a superior construction. Though numerically less, the power of production is materially increased : in addition to this, arrangements are now made in many of the machines for completely "finishing" their produce, *i. e.*, embroidering : thus dispensing with a great number of "lace-runners," which will account, in a great measure, for the apparent diminution in the number of hands employed in 1836.

There are now in full operation 3,200 bobbin-net machines ; the total number of quarters 34,382, giving employment to 5,556 men, 6,859 women and children, representing a capital of 1,329,445*l.* This is exclusive of buildings and requisite machinery for working the same ; and also of machinery and stock for silk-throwing, cotton-spinning, dyeing, bleaching, and dressing ; for Smiths' bobbin and carriage guide, comb and point makers, embroidering, carding, mending, &c., estimated at 1,616,500*l.*, in which occupations about 113,300 hands are regularly employed.

Total capital 2,965,945*l.* Total number of hands employed 133,015. Annual amount of business returns 2,300,000*l.*

These statistics are the result of extensive and careful inquiries made purposely for this occasion ; and are as accurate as such documents can be, considering the difficulty in some cases, of obtaining all the facts from manufacturers.

The "*Warp Machine*."—In addition to the bobbin-net machine for making lace, there is also the warp machine, several productions from which are exhibited on this occasion, of a novel and beautiful description.

The invention of the warp frame (about the year 1775) has been ascribed to four persons, Vandyke, a Dutchman, Mr. Clare, of Edmonton, near London, Mr. Marsh, Moorfields, London, and Mr. Morris, of Nottingham. Blackner (who was a contemporary), in his *History of Nottingham*, mentions three of these, and inclines to the opinion, that Mr. Crane, who was a mechanic, was the first to apply the warp to the common stocking-frame. It must here be understood that, for the common stocking-frame, but one thread is requisite; whilst to the warp, a thread for each needle was employed, and hence it derived the name of "warp machine." The first articles attempted from the new application, were silk stockings, having blue and white zig-zag, or, as they were called (from the supposed inventor), Vandyke stripes; and this new kind of hosiery continued in considerable request for upwards of twenty years. Purses also were made in considerable quantities after the same manner.

The first machines were about 16 inches in width, and they were merely the common stocking-frame, with the warp, or new principle applied.

In the years 1784-5, a person named James Tarratt, considerably improved them by applying treddles to perform the requisite movements, and built them as wide as 44 inches, by which improvements the speed was doubled, and the width tripled. About this period, a Nottingham mechanic considerably improved the warp frame, by the application of the rotary motion, and the "cam" wheels to move the guide-bars, which are still known in the trade as Dawson's wheels: he employed several of his improved machines in the production of officers' sashes, braces, purses, and other elastic textile fabrics, the manufacture of some of which continues to this day. In the year 1796, a person named Roland invented a new fabric from the warp, which was patented by Mr. Barber, of Bilborough, near Nottingham. This fabric was used very extensively for pantaloons, sailors' jackets, and other articles.

This new manufacture rose to great importance, and large contracts for the Admiralty were supplied. In the year 1812, 500 frames were said to be employed in the midland counties, on this article, which is still known as "Berlin," and is extensively used for the making of gloves. It is said, that in the year 1808, 1,800 point-net frames were at work in the neighbourhood of Nottingham. About this period, two persons of the names of Brown and Pindar, made silk lace from what they termed an upright-warp frame (from the needles being placed upright and not horizontally, as in the ordinary warp frame). In the year 1810, 120 of these upright frames were at work in Nottingham; and the wages of the workmen were very high, never less than 50s. per week.

In a very short period, lace was made from the horizontal warps; and the uprights were soon rendered useless. The first lace produced was of a very inferior description; and various attempts were made to improve it. At length, Brown and Copestake invented what was called the Mechlin net, which, from its intrinsic excellence, soon entirely superseded the point net; and in a short time 430 frames were making it; the wages of the workmen averaging four guineas per week; whilst the cotton used was 15 guineas per lb. From this period the point-net manufacture declined, until it became quite extinct; and the warp machine was in the ascendant.

Soon after the introduction of Mechlin lace, an imitation of it was made by a

Mr. Kirkland, which was known as "two-course" net; and another kind of silk lace known as "Blonde," invented by Daycock, appeared about the same time. These two kinds of silk lace subsequently attained to great importance, especially the latter, which still forms a considerable branch of the lace trade.

The blonde, soon after its introduction, became in great repute, and the workmen made enormous wages—it is said, as much as 10*l.* per week.

In the year 1819, the Mechlin disappeared; and soon after the two-course and blonde greatly declined, until 1830, from the large importations of French silk-lace; the French method of dressing being much superior to our own.

The bobbin-net machine which was invented and patented in 1809, had now become the great rival of the warp.

Cotton "Mechlin" lace speedily disappeared before the more approved manufacture, bobbin-net; and what from this new competitor at home, and large importations of silk lace from France, the warp trade may be considered to have fallen to its lowest state of depression. Numbers of the machines might be bought for the price of old iron; and many were broken up as no longer of use. Such was the state of this branch of industry when attention was directed to the ornamentation of lace on the machine. Hitherto, the lace or net had been made wholly plain, and was embroidered or "tamboured" afterwards by hand.

Driven from the plain by the bobbin-net, the warp was the first to attempt the ornamental; and has the credit of leading the way in what has become the most important branch of the lace trade. Boot, Roberts, Herbert, and Copestake were the earliest in the field, and laces with spots and bullet holes introduced first appeared.

A new kind of net also was produced, which was called "mock twist," in imitation of its rival the bobbin-net. From these sprang the tatting trade; and, suddenly, machinery which before was worthless, rose to a great value: many new machines began to be built; and these warp tattings gave quite a new impulse to the warp trade. Whilst the tatting trade was at its height in 1830-1, the silk blonde again revived under the patronage extended to it by the Court at this period. Machines were now constructed on improved principles; and rotary action was successfully applied. These gradually superseded those worked by hand, and instead of old 4½ inches wide, many from 100 inches to 150 inches were constructed. This state of prosperity continued for several years, until 1835-6, when the silk blonde and cotton tattings became greatly depressed.

The bobbin-net machine again outrivalled its forerunner by producing superior ornamented laces; and Heathcoat's plain silk bobbin-net had now begun to take the place of Nottingham white silk blonde. Notwithstanding these, the unemployed warps found other and new channels. Some were making gimps, and a still greater number lace mitts and gloves, which from 1836 to 1846 were in great demand; but these, during the last few years, have nearly become obsolete.

In 1839, the Jacquard was applied to the warp by Draper, of Nottingham. The increased capability which this application gave, inspired new hope for the warp-lace trade of Nottingham. A new class of products of elaborate design was manufactured, such as shawls, scarfs, mitts, falls, laces, &c.; but latterly the products of the Twist machine have to a great extent supplanted them.

Great improvements were made in dressing silk lace. Mr. Dunncliff first followed the French method of working the silk in the single thread, and in the raw state, instead of the organzine thrown which had heretofore been used. The result of this change was soon felt. French-dressed silk lace which had long been superior to ours was now equalled in whiteness and brilliancy; and at the present day, English-dressed lace is little, if at all, inferior to the best specimens from Lyons. Within the last few years, many new kinds of manufacture have been attempted from the warp, which deserve a special mention.

Elastic woollen cloth for gloves and other purposes is one of these. Henry Dunnington of Nottingham was the first who made it, and he has produced the best of this kind.

Many new kinds of elastic fabrics for gloves, both in silk and other kinds of material, have been made by Messrs. Ball and Co. A patent for velvet lace was obtained by Dunncliff and Dexter in 1845; but the making of velvet was not brought into practical operation until 1849, when Messrs. Ball and Dunncliff, and Messrs. Haines and Hancock, succeeded in making piece velvet suitable for gloves, the product at the present time being entirely used for this purpose.

During the past year the same parties have had granted a patent for making velvet in combination with lace; and for other novel weavings, specimens of which are shown in the Great Exhibition.

These latter may be considered as the latest improvements of the warp frame, which bring down our notice to the present period.

The number of machines now in operation, as far as can be ascertained, is about 1,400: 600 in the county of Leicester; 400 in Derbyshire, and 400 in Nottinghamshire, and are employed in the various branches as follows:—

150	blonde, and other silk laces.
150	cotton tattinga.
550	Leicester hosiery, &c.
100	lace gloves and mitts.
150	woollen cloth, hosiery, purses, and various kinds of fabrics for gloves, &c.

1,100	Total
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The average widths of the machines employed in the Nottingham trade are from 90 to 100 inches (some few being as wide as 150), whilst those engaged in the Leicester hosiery trade, are generally from 44 to 72 inches.

The number of persons employed in the warp trade is estimated at 10,000, and the capital invested 360,000*l.*, making a return per annum of 700,000*l.* On a comparison with former returns, it will be observed, that the number of machines employed in the lace branches is considerably less, whilst in the hosiery and other miscellaneous articles the numbers have increased. A warp blonde-machine 54 inches wide (which was about the average in 1830) would produce about 20 yards or 80 racks per week, which, when dressed, would be equal to about 50 square yards.

The power-machine belonging to Messrs. BALL, DUNNCLIFF, and Co. in the Great Exhibition, illustrative of the warp-lace trade, is capable of producing—

working 12 hours per day—800 racks per week, which, when dressed, would be equal to about 1,200 square yards. A yard of 4-quarter white silk blonde, which in 1830 sold for 2*s.*, is now supplied for 6*d.*

LACE made by hand, as "HONITON," and "THREAD" or PILLOW LACE, also "BRITISH POINT," TAMBOUR, and LIMERICK LACES.

Honiton Lace.—The description of lace termed "Honiton," is made by placing a perforated pattern upon a pillow, and employing pins, bobbins, and spindles to twist, and interweave thread in such a manner as to produce the required design. It was formerly confined to the production of simple sprigs and borders; but during the past twenty years considerable progress has been made, resulting in the manufacture of fabrics, displaying not only extreme delicacy of execution, but also beauty, and taste in design.

The Great Exhibition affords ample proof of this in the specimens of flouncings, shawls, scarfs, handkerchiefs, berthes, &c., which are there exhibited, varying in price from ten to two hundred guineas.

This striking change has not arisen from fortuitous circumstances, but has been mainly induced by eminent houses in the trade; who, to meet the taste required by their customers, have employed every means at their disposal to raise the character of this description of lace. They are fully alive to the conviction that the more the British manufacture becomes assimilated to the characteristics of the foreign (which are chiefly suitable, beautiful, and clearly-defined patterns, with refinement of execution), the more the demand for this lace will extend; and proportionally with such increased demand, they will be induced to expend still larger sums, in order to produce a higher class of designs. They are further encouraged in their exertions by the fact, that although the British lace cannot boast of design so exquisite, and execution so delicate as Brussels lace, it yet possesses remarkable and valuable qualities, inasmuch as it is produced perfectly white, does not change colour, and the price is very moderate.

The district in which Honiton lace is made extends about 30 miles along the coast of Devonshire, and about 12 miles inland. A very large number of persons (from 7,000 to 8,000) are now employed in producing it.

Pillow Lace.—"Pillow" or "Thread" lace, although made upon the cushion like Honiton lace, is distinguished from it by having both the pattern and the mesh made by hand, whereas, in Honiton lace, the pattern is made separately, and afterwards sewn on to *machine-made net*.

Not many years since a very considerable number of women and children were employed in its manufacture throughout the counties of Bedford, Buckingham, Northampton, and Oxford; but the demand having fallen off (being subject to fluctuation like all articles dependent upon fashion), has caused this branch of the trade to suffer severely. Contemporary, however, with the diminution in the making of white-thread lace, an increased requirement for black lace occurred; the manufacture of which was introduced into the districts enumerated, and has been attended with marked success.

It would be difficult to supply any accurate statistics as regards the number of persons engaged in this manufacture, as the nature of the article enables the

parties employed in producing it to carry on the operation apart from each other, and without interfering with a domestic, or retired life.

It is deserving of consideration, that the worth of the actual material bears such a small proportion to the value of the article itself, as to make the amount paid for the labour expended in its production to be almost the sole cost. This industrial product, therefore, cannot fail to enlist sympathy on its behalf, as it furnishes, in comparison with its price, a surprising extent of employment and maintenance, and these benefits, moreover, are afforded to a class of persons who otherwise would have a difficulty in earning a livelihood. In exemplification of which it may be said, that the poor in lace-making districts are comparatively well off, and better provided for than in other localities.

British Point Lace.—British point, tambour, and Limerick laces, possess alike considerable merit, and are very similar in the mode of their manufacture. These embrace the imitation of Honiton and Brussels lace, and are produced in shawls, scarfs, dresses, Court trains, flouncings, lappets, &c., exhibiting a beautiful display of chaste, elegant, and elaborate designs, and are well represented in the Exhibition.

"British point" is chiefly made in the neighbourhood of London, and is very superior as an imitation lace.

"Tambour" is made principally at Islington, London, Coggleshall in Essex, and at Nottingham.

The "Limerick lace" is peculiar to Ireland, and has been produced in considerable quantity.

There is also another description of this lace, which has been brought to great perfection. It is made in various articles, and presents an excellent imitation of the old Spanish point.

The prospects of these branches of the British lace trade are at the present time highly encouraging; and there is no doubt that by careful attention in producing appropriate designs for Honiton lace, and the cultivation of a taste for refinement and elegance, the manufacturers of this lace will be most successful in their exertions to render this department of British industry eminently worthy of the increased admiration of ladies of rank and fashion, not only in this but in other countries.

From the well-known character of the principal houses engaged in this enterprise, it may be confidently expected that Honiton lace will assume a position in the highest class of industrial art, combined with utility. Nor are the manufacturers of the other descriptions of lace, mentioned in this Report, at all behind in an energetic application of their resources, in order to excel in their various productions.

The decided improvement which has been made in the black laces now so generally worn, has led to the introduction of a new and important feature in the fabrication of piece goods, such as shawls, scarfs, veils, coiffures, &c., the manufacture of which in "black point lace," has commenced within the last twelve months, and is carried on in the southern districts of Buckinghamshire. It has already been attended with marked success, and is deserving of special notice.

It is a gratifying reflection that the growing appreciation of the wealthy and refined class, of the increasing merit of these really useful and ornamental articles

of British manufacture gives suitable employment to a large number of females at their own houses, thereby increasing their comforts, encouraging habits of industry, and adding to the general prosperity of the nation.

ENGLISH, IRISH, AND SCOTCH SEWED MUSLIN EMBROIDERY.

The national importance of this branch of industry, its rapidly increasing extent, and the progress made in its manufacture, as evidenced by the number of exhibitors from the United Kingdom, and the varied merit of their productions, call for particular remark.

The articles exhibited by Messrs. D. & J. MACDONALD & Co., and Messrs. S. R. & T. BROWN, both of Glasgow, and Messrs. BROWN, SHARP, & Co., of Paisley, are very gratifying proofs of the excellence attained both in design and execution.

In taking a retrospective view of the trade, it is difficult to fix the precise date of its origin; but there is no doubt that in the year 1770, in Scotland, and 1780, in Ireland, the germs of it were in existence.

Towards the commencement of the present century, the manufacture had so extended as to employ profitably the attention of eight or ten houses in Glasgow, and also a few in Belfast, but the trade generally seems to have made but little progress during the next twenty years, the employment being comparatively limited in extent, and the manufacturers principally confining their attention to the tambour branch of it (with the exception of some light cotton goods for foreign markets), in the almost exclusive production of trimmings, collars, robes, and baby linen.

One of the circumstances which first gave a decided impulse to the manufacture was occasioned by the social revolution wrought among the Scotch and Irish peasantry, and particularly the latter, by the destruction of linen yarn spinning by hand, through the introduction of machinery. Previously, the female population were so generally and profitably employed that it was with much difficulty their attention could be directed to "needlework," as a means of subsistence; but when the manufacture by machinery had nearly destroyed the occupation of hand-spinning, and the softened hum of the "wheel" ceased to be heard, both the women and girls of the country were left almost without any source of profitable labour, and a very serious change became apparent in the homes of the peasantry.

In these trying circumstances a new field of labour, destined to more than compensate, was opened to them in the manufacture of embroidery; and though some prejudice existed at first against the employment, the desire soon became universal to have it established. Manufacturers found it their interest to take advantage of the consequent abundance and cheapness of labour to extend their operations; and under their guidance, but frequently aided by individual philanthropy, schools were extensively opened for instructing girls in sewing: so that in a short period in the West of Scotland, and still more extensively in the North of Ireland, the workers increased to many thousands, and the trade became firmly rooted in a vast number of localities where previously it had no existence, the girls then, as now, principally working for Scotch employers.

The cheapness of labour alluded to, and the increasing skill of the workers, enabled the manufacturers to introduce, in lieu of tambouring, the more costly,

difficult, and beautiful "satin stitch," and other *sewed embroidery*; its cheapness, and superior elegance, not only leading to its being applied to additional articles of ornamental dress, but also to more enlarged use and demand, and to a consequent increase in the trade.

In its internal operations few circumstances were more beneficial to the manufacture, or tended so directly to the improvement of design, as the substitution, about the year 1830, of lithography, for that of the old, tedious, and expensive system of "block printing." The cost of each block varied from 5s. for the cheapest design, to 5*l.* for the richest; and the time required for cutting frequently reached three to four weeks; thus subjecting the manufacturer to never-ceasing delay, obliging him to make an inconvenient quantity to cover the expense of each block, and totally preventing cheapness in price, or variety of design.

On the other hand, by the lithographic press, the most elaborate and difficult pattern can be printed in a few hours, at the expense of a few shillings, and with a perfection and ease unattainable by block printing. The facility thus gained of multiplying patterns at such a trifling expense has afforded ample scope to the genius of the designer, the result being eminently promotive of taste, and of the production in the trade of endless variety and novelty of style. Few manufactures in the kingdom have made such rapid progress during the past fifteen years, or have afforded the same amount of valuable employment to the female population as that of sewed embroidery, it having in that period increased at least threefold.

The amount of employment in Ayrshire, and other places in Scotland, has not probably increased, from the population being less dense, and their being employed in other branches of manufacture; but in Ulster and the West of Ireland the embroidery trade has become almost universal, and is the principal support of the female population.

A recent writer, an eyewitness, having valuable opportunities for obtaining correct information, thus adverts to the subject:—"The progress of the trade was very slow at first, and, for a length of time, was like a speck in the great field of industrial employment; but during the last few years it has grown up, and spread itself north, south, and west, so that it has extended itself over half the counties of Ireland, and is at present giving more or less employment to a *quarter of a million of females*." He further adds, "in the counties of Donegal and Fermanagh, where it was unknown three years ago, there are now rival agents in almost every town, and in remote parts of these two counties, advertisements are frequently met with, posted on the trees by the road-side, from agents in the trade, one wanting a thousand workers, and another two thousand girls, whom he offers to teach gratis, if they do not know how to work."

The wages paid for working vary much in amount, depending in some degree on the prosperity or otherwise of the trade. Young and inexperienced workers will probably not receive beyond sixpence per week, the amount gradually increasing to 4s., 5s., and 6s., according to the dexterity of the worker; and a few first-class hands can occasionally earn as much as 10s. per week.

The exact number of manufacturing houses in the trade cannot be at this moment precisely ascertained; but the amount annually turned over in the manufacture is variously estimated at from 750,000*l.* to 1,000,000*l.* sterling, the latter being the most probable sum. On this hypothesis, at least 600,000*l.* (the

principal outlay consisting in labour) will be distributed in wages, the workers being invariably employed in their own houses, and in a shape the most beneficial, as they can thus, by their own industry, increase their comforts without endangering their morals.

The market for the industrial productions daily enlarges both at home and in the colonies, where there is ever a ready and secure demand. That of the United States ranks next in importance. A few years ago the transatlantic export of embroideries was merely nominal; now the United States take at least a quarter of a million's worth annually.

It is also a gratifying fact that notwithstanding the prevalence of hostile tariffs, the beauty and cheapness of the Scotch and Irish embroideries cause them to find an increasing sale, even in the most exclusive of the continental countries. In France, where by law they are totally inadmissible, they are nevertheless daily introduced, and one particular class finds extensive favour in the fashionable circles of Paris. Also, from various countries of southern Europe, a growing demand is springing up, which, doubtless, in a short period, will become so important as to lead to a further and valuable extension of this branch of industry.

In the Exhibition the home embroidery trade is well but not more than adequately represented, a great number of parties not having sent any of their productions; however, among those who compete are several who rank first in the trade, and in their hands the reputation of the manufacture is fully sustained.

While the foreign productions, exclusive of curtains, are chiefly confined to cambric handkerchiefs, muslin robes, and fancy articles, such as coverlets, table-covers, armorial designs, &c., the home manufactures exhibit largely every variety of collars, sleeves, cuffs, caps, robes, baby-linen, and most extensively in flouncings, insertions, and trimmings; also some beautiful toilet-covers and coverlets, the merit of which consists in their decidedly *useful character* and cheapness.

As regards the future prospects of the trade, they are of a decidedly hopeful character: the manufacture may not in future progress in the same astonishing ratio as hitherto, but there are ample grounds for expecting a further and important extension, based principally on the improvement in design and work which is being effected, as well as on the superabundance of cheap labour. A great amount of this labour is in process of training, and will continue to be absorbed so long as the employment is remunerative, producing in its turn competition, the surest guarantee for improvement in the work and consequently extensive sale.

Much has been done already to improve design, the attention of Government and of the trade being strongly directed to its importance. The Government schools especially, by affording manufacturers and parents generally the opportunity of educating their children in design, are tending largely to foster its growth; a circumstance which, sooner or later, will lead to the advancement of all fancy manufactures, and to none more so than that of sewed muslin embroidery.

In conclusion, with a trained and industrious population, such as largely exists in the north of Ireland and in Scotland, possessing a decided aptitude for the

employment, and willing to labour for a moderate remuneration—the manufacture conducted on the largest scale, with all the advantages of capital, a home market, extended foreign relations, and all the other facilities of commerce—the embroidery trade may reasonably expect not only to maintain its position, but look forward to an increase and prosperity hitherto unknown.

FRANCE

Lace and Embroidery.

France, proverbially a lace-making and lace-wearing country, has, on this occasion, maintained its high position by contributing some of the most exquisite work, principally hand-made, that has perhaps ever been exhibited, combining perfection of design with surpassing elegance.

In proof of this, it is only necessary to refer to the articles exhibited by Messrs. VIDEOCQ & SIMON, and AUGUSTE LEFEBURE, both of Paris.

The amount of business done, and the number of hands employed in the manufacture of lace and embroidery, are proofs of their high estimation in all countries.

Bobbin-net and Lace by Machinery.

The principal towns noted for the production of bobbin-net and lace by machinery in France, are Cambrai, Lille, St. Quentin, Lyons, and, above all, Calais and its suburbs, where there are more than 600 machines in active operation.

The manufacture of this article was introduced into France by English workmen, who, coming from Nottingham, established themselves at Calais, in 1817 and 1819, bringing with them a machine upon the "straight-bolt" principle. This branch of industry has continued to increase and prosper, having always followed the progress and inventions introduced at Nottingham.

Until the year 1845, the articles fabricated in France were only such as were known in the English market; but since that period this branch has been considerably improved by the application of the Jacquard system to the bobbin-net machine, more especially to that called "Leavers," and in consequence its production of articles of novelty has greatly increased.

The following articles are manufactured in a superior style, principally at Calais and at St. Pierre-les-Calais:—

1st. The Neuville ground, with coarse thread, on Leaver's machine.

2nd. The Malines. In order to imitate the lace of this name, made on the pillow, it is purled, and the pattern embroidered by hand.

3rd. The fine plat, made from 14 or 16 point machines, in imitation of the pillow-lace, called Valenciennes.

4th. The coarse plat made from 10 or 11 point machines.

At Lyons, a great quantity of silk net and black lace is made in imitation of pillow-lace.

At Cambrai, also, is produced, with great skill, black lace in lengths, and in piece, for berthes, scarfs, &c.

These articles are made on the circular machine, and are admirable imitations of the beautiful black lace of Caen and Chantilly, the patterns of which are most

correctly copied, while the difference in price is 75 per cent. This manufactory is in full work, and has been steadily improving for the last three or four years.

Embroidery.

Embroidery work of every description is of very ancient date in France: it gives employment to from 150,000 to 180,000 females, spread over more than twenty departments. 8d. to 1s. a-day is earned in the country, and double that sum in Paris.

This branch of industry is subdivided into several parts, which may be placed under two separate heads.

1. Embroidery in colours and fancy work.

2. White embroidery.

Fancy work embraces an infinite variety of forms, and is done in all colours, in all shapes, and on every kind of material.

The two chief seats of this manufacture are Lyons and Paris. It is in the latter place particularly where that great variety of tasteful articles of every description, that occupies so large a portion of its industrious population, is fabricated; for example, embroidery in cotton, wool, silk, straw, gold and silver, thread, beads, &c., &c.: and it is from the workshops of Paris that those magnificent fabrics are sent forth, from rich robes, shawls, and scarfs, to the smallest fancy article, such as purses, bags, Greek caps, cigar-cases, &c.

If the embroidery in fancy articles is so considerable, much greater is that of white embroidery: in fact, this work is carried on in many different ways, by hand, in a frame, with needle, or crochet, with *passé* or *plumeti*, &c., &c. White embroidery is always done upon lace, muslin, or fine cambric.

Embroidery for furniture is principally done in crochet.

The chief seat of this branch of manufacture is Tarrare, where lace and muslin for curtains and window blinds are worked; as also *mousseline-de-laine* for ladies' dresses, mantles, and *pelerines*, which is likewise in crochet.

At Luneville the work is principally done on tulle with the needle, and consists generally of scarfs, dresses, collars, *pelerines*, and other articles of taste and novelty. But the very fine embroidery in satin-stitch, for articles of luxury, is the most important part of this branch.

The seat of this beautiful manufacture was formerly Nancy; but for some years past it has extended to the departments of La Meurthe, La Moselle, La Meuse, and des Vosges (forming the ancient province of Lorraine). In these departments they formerly worked on the hand only; but, for the last four or five years, frame embroidery has been more esteemed as giving greater neatness and perfection to the work, particularly in the extra fine. Special attention is now given to the instruction of the new hands in the use of the frame only.

It is in the department of the Vosges that this work has been attended with the most complete success. The women of this department have great aptitude for the employment, and their number is daily augmenting. The characteristic of the Frenchwoman is the remarkable taste she displays in her work. In this delicate and beautiful branch of art, chasteness and elegance of design effect much, but still the embroiderer must blend with these, taste and intelligence. The French workwomen excel in open work, which gives so light and graceful an effect to the

various rich patterns so eagerly sought for and so difficult to obtain. This excellence is attained principally through their being accustomed to the manufacture of white lace by bobbin or needle, generally known throughout France, and which offers so many beautiful patterns for imitation. Every embroiderer pursues her work at home with her family, leaving off when household affairs require her attention, and taking it up again when she pleases. This system has introduced much comfort and ease where it exists.

Hand-made Lace.

The manufacture of lace by hand in France gives employment to upwards of 200,000 females, from six to seven years to a very advanced age; each individual earning upon an average, for a day's work of ten hours, from 6*d.* to 1*s.*, sometimes more, according to her skill, or the demand there is for the article.

All French lace is made with bobbins, upon a small portable pillow or cushion, except at Alençon, where the needle is employed and working on parchment.

This branch of industry has latterly increased to an immense extent, and nothing can be more admirable than the beauty of the patterns, combined with the purity of the work and delicacy of the web.

Hand-spun linen thread, cotton, wool, silk, and often gold and silver thread, mixed with the silk, are employed. The great expense in this manufacture is the labour, for in the east of France, setting up work, and the purchase of material does not exceed, upon an average, 12 to 18 per cent. of the whole.

About twenty years ago all the white lace was made with linen thread, spun by hand (called *Malguinerie* thread); at present, however, it is rare to find any other used than cotton thread, Nos. 120 to 320.

White and black blonde and black lace are manufactured in the same manner as white lace, there being no difference in the work, the material alone being changed.

Formerly white lace only was made, at present blonde and black silk employ half the workers.

This branch is spread over a great part of France, extending from north to south-east, through fifteen departments. Each district has a peculiar style, and what is very remarkable, that, although made in the same way, with the same material, they are instantly recognized; hence the different appellations by which they are known, are derived from the seats of their manufacture. The following are the principal places where this manufacture is carried on in France:—

1. Caen and Bayeux.
2. Chantilly and neighbourhood.
3. Lille.
4. Arras.
5. Mirecourt.
6. Du Pay.
7. Boilleul.
8. Alençon.

For an explanation of the productions of the above-mentioned establishments, a short notice of each is here given.

1. *Caen and Bayeux* (Calvados).—The manufacture of lace in these places is much the same, and is the most extensive in silk lace, in length and pieces, employing from 35,000 to 40,000 women. The manufacture of silk lace at Caen, and particularly at Bayeux, was formerly very little known; now, however, it is different, and scarcely any other tissue is made.

The first silk blonde was made at Caen, and called blonde, being made of undyed silk of a nankin colour; now they only use silk of the finest white, or of the finest black, with the exception of a few coloured blondes.

The blonde manufacture had rapidly risen to great perfection, and Caen stood unrivalled in her prosperity; but fashion or caprice changed the face of things, the demand for the article became every day diminished, and the majority of the workers are now employed on black lace. Caen and Bayeux excel all other places in the production of what are called piece goods, such as veils, scarfs, berthes, mantles, ladies' robes, shawls, &c., &c., and are considered of these goods the most extensive manufactures in the world. The women of the department of Calvados are remarkably quick at this work, and by means of a stitch called *rucro*, which is used in joining several parts in one entire piece, so that the same is imperceptible to the eye even with a glass, they are able to perform in less than a month, with nine or ten persons, what formerly occupied a workman one whole year. The manufactures have attained a high reputation, on account of the skill of the workpeople in silk and thread lace.

2. *Chantilly*.—Though this is a name given to a particular lace, being the place of its birth, its fabrication has been principally removed to the neighbouring districts. This lace completely resembles that of Bayeux, except that it has been brought to much greater perfection in the production of finer and richer articles; the prices, consequently, range higher. Fewer hands are employed than at Bayeux, but the improvements of the latter have been regularly adopted. The articles manufactured are less intended for general use, than to satisfy the desires of the luxurious, being laces of the very finest textures and most beautiful patterns.

3. *Lille*.—This manufactory is the oldest in France; it is small, and has not, for a length of time, increased; on the contrary, the only article produced here is white thread-lace, very light and simple, called *clear foundation* (*fond clair*). Of all similar productions, these are the finest, the lightest, the most transparent, and best made, and, consequently, in higher esteem than any other. This manufacture is of little importance, being on the decline. The workwomen of Lille derive more lucrative remuneration from other industrial resources in that town.

4. *Arras, Pas-de-Calais*.—This manufactory is in the same condition as that of Lille. The lace of this place is, however, esteemed for its low price, but the designs require to be improved.

5. *Mirecourt, Voeges*.—Contrary to that of Arras, this manufacture is constantly introducing new designs. Nearly all the improvements and novelties in lace-making proceed from Mirecourt, which is renowned for the good taste and elegance of its productions. The same kind of lace is made here as at Lille and Arras, that is to say, clear foundation, and "*fonds de champs*," in white thread-lace.

They also produce here a lace very much resembling the Honiton, called "*guipure*." Within the last four or five years flowers have been made and sewn

upon that extremely fine net termed "Brussels net." This fabric has, in two years, been so much improved that it now bears a close affinity to the Belgian, at Binche and at Brussels, and is greatly esteemed for its admirable whiteness, its fine quality, and moderate price.

6. *Puy, Haute-Loire*.—This town employs the greatest number of workpeople in France, from 40,000 to 50,000 being spread through the neighbouring departments. The lace made here is coarse, and not rich in texture, but of low price. At Puy all kinds of lace are also made in silk, thread, and wool, as well as point, clear point, point de Chacey, and point de Valenciennes. This town also produces black and white lace, blonde, and other articles of every colour, and especially worsted lace, in pieces, shawls, scarfs, &c. This manufacture promises much for the future, being situated in a province where there are few other industrial resources, and where labour is consequently cheap. The workwomen of Puy and its environs are very skilful, and yet, up to the present time, they have only succeeded in ordinary articles, for which there is no competition.

7. *Bailleul*.—This is the only important town in France for Valenciennes: it produces lace of the same kind as that of Bruges (Belgium), but rather coarser. The lace of Bailleul possesses two valuable qualities, being the whitest and the cheapest. This lace, though somewhat thick, is very good.

8. *Alençon, Orne*.—The lace of Alençon is the only fibre of this description not made on the pillow, being worked entirely with the needle. It was introduced into France in 1660, by Colbert, who sent to Venice and Gênes for workmen, and they introduced the *point de Venise*, which was at first named *point de France*, and afterwards *point d'Alençon*, from the name of the town where it was made. This lace, however, does not resemble in any manner the *point de Venise*, as it forms an exception to the others; for, while in the other fabrics one single worker is required to make the richest piece, the Alençon requires from fourteen to sixteen different workers, for the smallest size, even one-quarter of a yard, and the most simple pattern. It is the only lace made with pure linen thread (hand-spun). This thread is worth from 100*l.* to 120*l.* per pound.

All the workwomen here are extremely skilful. The open work in the lace is made in a superior style, and every day new is made of great perfection. It is the richest, the finest, and the strongest; and, consequently, the prices are the highest. There are in France several other manufactures of lace, but the foregoing detail will be a *résumé* of all.

This branch of industry, one of the most important, is very interesting, particularly as regards commercial relations, and in a moral point of view.

All the females employed in making lace carry on their work in their own houses, under the surveillance of their parents or friends, who act as their instructors.

SWITZERLAND.

Switzerland has largely availed herself of the benefits held out by this Exhibition, and well sustained her long-enjoyed celebrity for both lace and muslin embroidery of every description. It will be seen by the numerous articles shown (displaying at once cultivated taste and excellence of work, combined with cheapness and utility), that her motto is progression, and, as stated by one of

themselves, "Under the beneficial effects of free trade the Swiss sewed-muslin trade has made enormous progress." From the variety of articles manufactured, the excellence of the work, and the beauty of the design, the manufacturers send their productions to all parts of the globe, and find ready sale, even where they are met by hostile tariffs. The hands available for needlework in Switzerland are no longer sufficient to satisfy the demand, and the Swiss manufacturers are employing large numbers in the eastern provinces of Austria, and the southern provinces of the Duchy of Baden.

It would be difficult to state the exact numbers employed in this branch of manufacture, the hands not being in factories or large rooms, as frequently the case in this country—the pattern being stamped or printed on the muslin or net, and given out to workers at their own homes, so that many do their household work, and fill up their time with this embroidery; there cannot, however, be less than 40,000 earning their living by this branch of industry.

A good steady hand can earn, in ordinary times, 1s. per day; second-class hands, down to children, range from 3d. to 8d. per day. The needlewomen of Appenzell (Rhodes intérieures) are noted as the most skilful workers in sewed muslin, &c.; hence the finest and most difficult work is done there, and the highest wages are received.

Those articles in which cheapness is the recommendation, are done by the needlewomen of St. Gall, Vorarlburg, and Baden. It is estimated that 100,000 pairs of curtains alone are annually imported into the United Kingdom of Great Britain, at prices varying from 3s. to 100s. per pair, paying a duty of 15 per cent.

The Swiss manufacturers do not regard England as their best customer; they export largely to America (North and South), Germany, Italy, Spain, and other southern countries. The trade is steadily progressing, and is principally conducted by the manufacturers of the canton of Appenzell, a few only residing at St. Gall, where they have a Wednesday's and Saturday's market for the transaction of business.

The continued care for new styles, novel designs, and cheaper productions, has evidently had the effect of developing the skill and artistic faculties of the Swiss manufacturers, as may be seen by the unrivalled excellence of some of the goods in the Exhibition.

The productions of Mr. J. J. SUTTER and Mr. J. U. TANNER, both of Buhler, are here more particularly referred to, as being of unrivalled excellence.

SAXONY.

Saxony has furnished a small assortment of lace and embroidery, mostly of a manufacture peculiar to the country, being heavy, firm, and well made, but of limited sale in the English market.

SPAIN.

The exhibition of lace and embroidery is limited, although there are some articles deserving of notice, from their richness and antiquity.

HAMBURGH.

There is little from this place, except some specimens of embroidery with hair, displaying much taste.

AUSTRIA.

We cannot say much of the articles exhibited in lace and embroidery, as they are very few, and of a class that would not suit the British market.

MALTA.

There is little worthy of notice from Malta.

LACES OF BELGIUM.

The description of lace peculiar to this country is admirably sustained by some of the exhibitors in this department, there being a valuable display of Valenciennes edgings and laces of Mechlin, and other goods of the most costly and superb character, representing some thousands of pounds in value, evincing at once the taste and perseverance of the Belgian manufacturers, who are finding employment for at least a hundred thousand hands annually, by the production of this description of lace, used principally by the middle and upper classes of society.

Belgium still retains the pre-eminence it has long enjoyed, for the perfection displayed in the manufacture of the most beautiful laces; in proof of which the articles exhibited by Messrs. DUHAYON-BRUNFAUT and Co., of Brussels and Ypres, may be more particularly referred to, as also those of other exhibitors. The laces chiefly manufactured are termed Brussels, Mechlin, Valenciennes, and Grammont laces.

I. "Brussels produces two different descriptions of lace, known as "Point à l'aiguille," and "Brussels plait."

The former is made entirely with the needle, the latter is made on the pillow, and "Honiton lace" very much resembles it.

The finest and most expensive kind is made of very fine flax thread, and some of cotton. Formerly the laces were made only on the "real ground," which is made on the pillow in narrow widths of from 1 to 3 inches, and then joined with such admirable ingenuity as to be imperceptible.

It is of the most beautiful description, being remarkably soft and clear, but so costly as to be within the reach of comparatively few persons. Hence it was only worn at Court, and by the most wealthy.

Trimming lace of 4 inches wide varied in price from four to ten guineas per yard: veils from twenty-five to one hundred guineas each, and other articles were proportionately expensive; but recently, owing to the great improvement which has been effected by eminent houses in the town of Nottingham (England), in producing a very superior net by machinery, the lace is now manufactured at a much less cost; the flowers, or designs, being made by hand, and afterwards sewed on to the "machine-made" net. This description of lace is known by the term "application of Brussels," and its resemblance to the Brussels point lace is so striking, as frequently to deceive those who possess a good knowledge of lace.

"Brussels plait" is in considerable use in France, Spain, Russia, and other countries, and is made of most exquisite quality.

The "point à l'aiguille" is more worn in England; and since the great improvements which have been made in producing this beautiful lace at so considerable

a reduction in price, the demand for it has become very general, and it is now worn by nearly all ladies of rank and fashion.

In the manufacture of Brussels lace several classes of workers are employed, as follows :—1. Those who make the flowers in plait. 2. In point. 3. The real ground. 4. The ground in the flowers. 5. The attacheuses (fasteners). 6. Those who apply on the net. 7. Those who work the point, and the new kind of real Brussels, &c. (the “gase point”).

With the exception of the point d’Alençon (made in the north of France), Brussels produces the most valuable lace that is known.

II. Mechlin laces are made at Malines, Antwerp, and in the vicinity, and are of the lightest and most beautiful texture. They are all made in one piece on the pillow, and their peculiarity consists in a plait thread surrounding the flowers, and designing the outline, so as to give the appearance of embroidery. This manufacture has suffered very much from the caprice of fashion.

III. Valenciennes laces are made chiefly in the following towns, and the surrounding villages, viz., Ypres, Menin, Courtrai, Bruges, Ghent, and Alost.

Although all made in the same manner on the pillow, yet the productions of the various towns named are so characteristic, that a person accustomed to examine them, will readily distinguish where each piece of lace was made.

1. Ypres excels particularly in laces of the finest square grounds, of the widest and most expensive description, varying in price from 6*d.* to 50*l.* the English yard. This branch of industry was commenced at Ypres about 1656; and according to a census made by Louis XIV. in 1684, there was then one lace manufacturer, and 63 workers employed. It is only since 1835, that its trade has been so considerably developed; and now it is estimated that the lace-dealers of Ypres purchase the produce of about 20,000 workers living in the town and its environs.

The bulk of the lace manufactured here is exported, principally to England, France, and Germany, and a trade has been opened with the United States; but a great barrier to its increasing development exists in the greatly-varying duties levied upon lace by different countries.

2. Menin provides employment for about 2,000 or 3,000 workers.

3. Bruges. The manufacture in this town has immensely increased, and a considerable trade is now carried on. The laces here are of a good, useful quality, suitable for trimmings, and are much sought after by English buyers; but the number of persons engaged here in the making of lace is not so large as in Ypres.

4. Ghent. The fabric of this place is extremely good, and laces of all qualities are produced, principally consisting of the narrow and medium widths, employing in their manufacture about 10,000 or 12,000 persons.

5. Alost possesses very excellent workers; but the designs are not equal to those of Ypres, and the colour of the laces is inferior.

IV. In the village of Grammont great improvements have been made in white-thread lace, also in black point trimming laces.

Recently, the manufacture of piece-goods, as shawls, scarfs, berthes, &c., has been commenced, and is carried on with great success. The quality and designs are not equal to those of France, but the prices are much lower, and these productions are now in considerable demand.

BRITISH LACE.

A Council Medal has been awarded to BALL, DUNNICLIFFE, and Co., Nottingham (19), for velvet and Simla lace; being new patented fabrics, suitable for shawls, dresses, and for various ornamental and useful purposes, and of commercial importance. Also imitation Valenciennes, and white and black point tulle, of great merit.

The Jury award Prize Medals to the following:—

AYERS, W., Newport Pagnell, Bucks (388), for specimens of wide thread-lace of good useful quality.

CLARKE, ESTHER, London (130), for a Honiton lace flounce, of which the design and quality are unequalled in its class.

FISHERS and ROBINSON, Nottingham (2), for imitation of Valenciennes laces, black trimming laces, and patent spot-nets, all possessing merit as machine-finished goods; also two tamboured net shawls, with a variety of excellent black Jacquard laces and shawls of superior merit.

FORREST, JAMES, and SONS, Dublin (45), for jacket-flouncings, scarf, berthe, and handkerchief, in imitation of old Spanish point, with specimens of Limerick lace. The whole unequalled in their class.

GREASLEY and HOPCROFT, Nottingham (34), for very superior Jacquard shawl; also flouncings and falls, together with some needlework-shawls well executed, and truthful imitations of real lace.

GROUCCOCK, COPESTAKE, MOORE, and Co., London (3), for Honiton guipure half-shawl, flouncings, lappet, and trimming-lace, of excellent design and manufacture. Double-flounced dress, with court train, tamboured on fine Brussels net, elaborately worked and well designed. Very wide Buckinghamshire lace of fine quality. Embroidered muslin low and high chemisettes, collars, cuffs, trimmings, &c., of superior work.

HEALD, B., Nottingham (269), designer, for pattern for broad lace flounce, evincing good taste and suitability of design.

HEYMANN and ALEXANDER, Nottingham (25), for machine-made lace curtains in great variety; also, plain and fancy nets, remarkable for cheapness and utility.

HOWELL, JAMES, and Co., London (5), for guipure Honiton lace shawl and mantle of very excellent manufacture.

LAMBERT and BURY, London (4), for Limerick lace shawl and tunic dress.

LESTER, T., Bedford (236), for wide white and black lace.

MALLETT and BARTON, Nottingham (29), for imitation black trimming-laces, and Valenciennes edgings.

RECKLESS and HICKLING, Nottingham (32), for shawls, scarfs, flouncings, falls, and trimming-laces, in imitation of black point lace. Also for white tamboured shawls, scarfs, flouncings, and falls. The whole possessing great merit in design, as well as in execution.

RIEGO DE LA BRANCHARDIERE, E., London (17), for basket of flowers, rock, berthe, &c., in crochet-work, very beautiful.

ROBINSON, THOMAS, Nottingham (25A), for machine-made lace curtain of excellent quality and graceful design, exhibited by Heymann and Alexander.

ROLPH, JONAS, Coggeshall, Essex (282), for double flounce, scarf, and berthe; the design superior, and the work unequalled in its Class.

STEEGMANN, H. and Co., Nottingham (41), for machine-made lace curtains of great beauty of design and general excellence.

TREADWIN, C. E., Exeter (55), for Honiton guipure flounce, resembling ancient lace; the pattern, from Government School of Design, is particularly commended.

VICCARS, R., Padbury, Buckingham (235), for wide thread-lace of fine quality.

VICKERS, WILLIAM, Nottingham (33), for shawls, scarfs, mantles, falls, flounces, and trimming-laces, of great merit in design, and for their faithful imitation of real black point lace, and at comparatively moderate price.

WEEDON, FRANCIS, London (6), for British point lace shawls, lappets, and specimens of flouncings; designs very good.

WHITLOCK and BILLIALD, Nottingham (27), for imitation laces; an admirable copy of the real Mechlin.

The Jury make Honourable Mention of the following Exhibitors in this department:—

ADAMS and SONS, Nottingham (21), for thread edgings, made on the traverse warp machine, being neat and useful goods.

CARDWELL, C. and T., Northampton (122), for pillow-lace of different widths.

CLARKE, JANE, Regent Street, London (18), for specimens of lace, copies of old Spanish point; the work extremely fine and beautiful.

GILL, W. L., Colyton, Devonshire (386), for specimens of Honiton lace, in imitation of Spanish and Venice point.

HEALD, HENRY (295), student of Government School of Design, Nottingham, for pattern of half shawl in good taste.

HERBERT, THOMAS, and Co., Nottingham (28), for imitation blondes, laces, crochet-edgings, &c.

IRISH WORK SOCIETY, London (77), for various descriptions of lace, knitted, netted, and crochet; also, various specimens of hosiery.

KIGHTLEY, I. (123), for pillow-lace, narrow and wide.

LADIES' INDUSTRIAL SOCIETY, Dublin (213), for infants' lace-ropes, imitation of Spanish point; also shawl, mitts, parasols, &c., made from the fibre of sweet pea, nettles, and honeysuckles, an application of a new material to textile purposes.

LAUGHER and COSENS, London (10), for Honiton half-shawl of good quality.

SIM, C. J., Bedford (301), for two pair of lappets made on the pillow, an excellent imitation of Mechlin lace; also various trimming-laces.

TURTON, SAMUEL (179), designer, Nottingham, for a design for lace curtain.

SCOTCH AND IRISH EMBROIDERY.

The Jury award Prize Medals to the following subjects:—

BRIE, J., and Co., 189 Regent Street, London (24, Class XX.), for embroidered shirt-fronts, tasteful in designs and of fine work.

BROWN, SHARPS, and Co., Paisley, and 18 Watling Street, London (57), for embroidered muslin robe, of great richness of effect and splendour of design.

BROWN, S. R. and T., Glasgow (58), for rich book-robe, short cambric frock, cambric handkerchiefs, stomachers and collars, with other articles of great beauty, utility, and excellence; also, a number of book-muslin collars exhibited for lowness of price.

HOLDEN, J., and Co., Belfast, Ireland (1, Class XIV.), for muslin insertions and trimmings, embroidered robes, and frock-bodies; also, some fine embroidery in robes and jaconot, remarkable for cheapness and effect.

MAIR, J., SON, and Co., 60 Friday Street, London (59, Class XI.), for three muslin robes (sewed and tamboured), very chaste in design and of excellent work.

MACDONALD, D. and J., and Co., Glasgow (66), for embroidered muslin robe, cap, and bassinet; designs very graceful, and work exquisite, being the finest sample of sewed-work in English, Scotch, or Irish embroidery. This firm also exhibit medium and wide open-work flouncings, fine broad trimmings, embroidered muslin robe, high chemisettes, and many other articles of merit in design, execution, and utility.

SALOMONS and SONS, 42 Old Change, London (305, Classes XII. and XV.), for embroidered guipure cambric cape and handkerchief, high chemisette, and collar, work of much excellence and great novelty in the introduction of a new guipure stitch.

The Jury make Honourable Mention of the following Exhibitors in this department:—

BROWN, HUGH, Glasgow (64), for muslin flounce and trimmings, embroidered robes, and cambric handkerchiefs.

BROWN, J. R. and W., Bangor (2, Class XIV.), for embroidered muslin robe, of good work.

CAPPER and WATERS, London (21, Class XX.), for court suit in work, lace frill and cuffs in imitation of point lace.

ROBERTSON and SONS, Glasgow (62), for cambric table-cover, collars, and other useful embroidery.

BRITISH TRIMMINGS AND FRINGES.

The Jury award Prize Medals to the following subjects:—

BENNOCH, TWENTYMANN, and RIGG, 77 Wood Street, Cheapside, London (394), for a variety of gimps, fringes, and cameo braids, showing general excellence.

DANBY, C. and T., 14 Coventry Street, London (71), for a variety of silk fringes, garniture for dresses, cord and tassels, and other trimmings of taste and novelty.

EVANS, R. and Co, 24 Watling Street, London (74), for silk fringes, braids, and fancy huttons.

HAMBURGER, ROGERS, and Co, 30 King Street, Covent Garden, London (186), for epaulettes, military hats, and embroidery suitable for regimentals, of good design and execution.

LAMBERT, BROWN, and PATRICK, 236 Regent Street, London (83), for epaulettes and laces, embroidered waistcoats, masonic emblems, church decorations, facsimile of Bible used by King Charles I. embroidered in gold, and coloured silks; all of great merit.

UPHOLSTERY FRINGES, TRIMMINGS, AND COACH LACES.

The Jury award Prize Medals to—

BURGH, ROBERT, 42 Bartholomew Close, London (75), for specimens of gimps, tassels, and ornaments, in fine taste, and well executed.

JULLIEN, sen., Tours (Indre and Loire), (1280, France), for specimens of gimps, fringes, tassels, ornaments and glass frames, formed of silk rope, very tastefully and well executed.

LEES, R. and Co, 36 King Street, Cheapside, London (79), for printed mohair velvet, of very handsome design and well executed.

SCHAEFF, R., Brieg (118, Prussia), for a large assortment of coach laces and trimmings, possessing a high degree of excellence in design and execution.

The Jury make Honourable Mention of the following Exhibitors:—

ELLIS, SOPHIA A., Ireland (159), for specimens of tatting in collars, berthes, chemisettes, &c., of very fine quality.

GUILLEMOT BROTHERS (251), for coach and livery laces.

HARRISON, T., London (85), for altar-cloth and cushions of crimson Genoa velvet, embroidered in gold.

KINGSBURY, LOUISA, Taunton (225), for a basket of flowers, &c.

OXION, E., Birmingham (56), for an assortment of good fringe, tassels and ornaments.

PUZIN, Beaumont Depot (1414, France), for lace and trimmings for carriages, and livery laces, extremely good.

STANDRING and BROTHER, Manchester (239, Class XXIX.), for a good assortment of braids, laces, plaited lines, binding plain and figured, and fringes for dresses.

WESTHEAD and Co, Manchester (275, Class XXIX.), for a good assortment of tapes, and binding of various kinds, lines, &c.

ZEISIG, H., Breslau (225 Prussia), for specimens of upholstery and coach trimmings of good workmanship.

FRANCE.—LACE AND EMBROIDERY.

The Jury award Prize Medals to the following:—

AUBRY, BROTHERS, 33 Rue des Jeuneurs, Paris (1544, France), for laces from Mirecourt, made in the same manner as Brussels plait; double skirt-

dress, half shawl, coiffure, lappets, also trimming lace, &c. Designs and work meritorious.

BERR and CO., 17 Rue de Cléry, Paris (54, France), for robe, shawl, scarf, veil, berthe, cape, &c., in imitation of Brussels lace, being superior to any others exhibited of their class.

DARNET, Rue Richelieu, Paris (1578, France), for a great variety of shirt fronts, beautiful in designs, and of good embroidery.

DEHBELD-PELLERIN, and Co., 73 Rue Richelieu, Paris (1173, France), for a magnificent counterpane (worked at Nancy). Beauty of design, excellence of work, and general effect.

DELABOCHÉ-DAIGREMONT, 17 Rue de la Paix, Paris (267, France), for muslin robe, jacket, and a variety of cambric handkerchiefs and collars, all of much merit.

FOULQUIÉ, Mlle., and Co., 20 Rue Hauteville, Paris (1603, France), for collars, half shawls, neckerchiefs, and other articles of knitting work, possessing merit as regards novelty and cheapness.

HEYLER, Mlle. MARIE, 36 Rue de l'Echiquier, Paris (539, France), for silk-net mittens and gloves of very superior quality.

HUBERT, Madame JOSEPHINE, Mondeville, and 2 Rue du Grand Chantier, Paris (268, France), for head-dresses, and garnitures for robes, in needle-point relievo. Designs of high artistic excellence, and much novelty and ingenuity exhibited in their application for the purposes named.

LEFEVRE, AUGUSTE, Bayeux, and 42 Rue de Cléry, Paris (1646, France), for white thread-lace counterpane, black lace half-shawl and scarf; Alençon point lappets and scarf, and white blonde mantilla. The white lace counterpane is a very beautiful production, and deserving the highest encomiums for fineness of quality, beauty, and elaboration of design.

LEMIRE and SON, 1 Rue des Feuillants, Lyons (1649, France), for embroidery in gold, and the application of gold and silver to this purpose, evincing superior skill. (Prize Medal awarded by Jury of Class XIII.)

MALLET BROTHERS, Calais (599, France), for specimens of machine-made imitation Valenciennes lace and lappet. Fine ground and good patterns.

MICHELIN, T., 139 Rue Montmartre, Paris (641, France), for fancy ribbon trimmings for dresses and cloaks. Designs very tasteful.

MÉRAUX, J. H., 7 Rue de la Jussienne, Paris (631, France), for patterns for rich flounce, handkerchief, lappets, &c., in excellent and appropriate taste.

MOREAU and Co., 22 Rue d'Enghien, Paris (652, France), for embroidered shirt-fronts, of much merit, both in design and execution.

MOULARD, Mlle. 39 Rue Montmartre, Paris (655, France), for lace head-dress, caps, tobacco-bags, net-purses, with various fancy articles in chain-stitch work.

MORNIEUX, F., 31 Rue Ménétrier, Paris (1362, France), for galloons, and buttons of superior quality, and excellent taste.

PAGNY, Paris (675, France), for black point-lace shawl and scarf. Design and quality deserving high praise.

REPIQUET and SILVENT, Place de la Croix-Paquet, Lyons (1432, France),

for a large variety of velvet and silk trimmings in very good taste. (Prize Medal awarded in Class XIII.)

RANDON, L, Caën, and 9 Passage des Petit Pères, Paris (1684, France), for white blonde flounce, scarf, berthe, lappet, and coiffure; also lappet in gold and silver. Decided merit in an effective and beautiful style of design, with great richness of effect.

VAUGEOIS and TRUCHY, Rue Mauconseil, Paris (718, France), for gold and silver embroidery. The arms of Paris, chasuble, epaulettes, and fringes.

VIDECOQ and SIMON, 35 Rue de Jeuneurs, Paris (1706, France), for Chantilly shawl, scarf, dress, flounce, and suite of Alençon point-lace. The magnificence of design, extraordinary beauty, and surpassing quality of the articles exhibited, merit the highest praise.

FRENCH LACE, &c.

The Jury make Honourable Mention of the following Exhibitors in this department :—

AUDIAT, F., Paris (1545, France), for embroidered imitation trimming laces, on Mechlin grounds, of good design and workmanship.

DABARET-TAMPE, Oise (152, France), for a great variety of silk buttons.

DELCAMBRE, A., Paris (1584, France), for gold and natural colour silk lace, and black point-lace and scarf.

HOOPER, CARROZ, and TABOURIER, Paris (1625, France), for lace scarf, lappets, and berthe, in imitation lace.

LAROCHE, E., Designer, Paris (291, France), for pattern suitable for guipure lace; (Prize Medal awarded by Jury of Class XXX).

LAURENT, J. B., Paris (902, France), for silk buttons and other articles of trimming.

MARTIN, C. A., Paris (613, France), for silk buttons, fringes, &c.

MERCIER, Paris (1354, France), for purses, Greek caps, reticules, and various other fancy articles, evincing much taste and novelty.

SEGUIN, JOSEPH, Puy, Haute-Loire, and Paris (1008, France), for new description of black diamond open ground lace in half-shawl, mantle, and laces.

TUISSANT, Designer (France), for rich scarf with guipure border, showing novelty in design.

SWITZERLAND.—LACE AND EMBROIDERY.

The Jury award Prize Medals to the following :—

ALTHER, J. C., Speicher, near St. Gall (110, Switzerland), for muslin curtains, embroidered in colours, in good taste.

BUNZIGER, J., Thal, near St. Gall (188, Switzerland), for embroidered double-flounced dress, of great novelty and design; arms of England embroidered on cambric, with several other articles of merit.

EHRENZELLER, F., St. Gall (191, Switzerland), for net and muslin curtains, very chaste in design, and of superior work.

FISCH BROTHERS, Buehler, Canton of Appenzell (192, Switzerland), for net curtain, decided novelty in design.

SCHLAEFFER, SCHLATTER, and KÜRSTEINER, St. Gall (201, Switzerland), for two pairs of net curtains, of excellent design; with a variety of other useful articles.

SCHOCH, SCHIESS, and SON, Herisau, Canton of Appenzell (202, Switzerland), for embroidered handkerchiefs, of good work and rich design.

STAEHEL-WILD, C., St. Gall (208, Switzerland), for two embroidered table-covers, window curtains, waistcoat piece, several handkerchiefs and collars: the whole of beautiful design and superior work.

SUTTER, J. J., Bühler, Canton of Appenzell (203, Switzerland), for chintz book robe of great beauty; net curtain, with Swiss scenery, several cambric handkerchiefs, exquisite in design, illustrating various objects in natural history, combined with landscape views and other objects of novelty portrayed in needle-work.

TANNER, J. U., Bühler, Canton of Appenzell (205, Switzerland), for embroidered coverlet, figure of William Tell in the storm. Framed piece of needlework, representing a girl embroidering the figure of William Tell; cambric handkerchiefs of great beauty, bouquet of flowers, in silk; with other articles of great merit.

TANNER and KOLLER, Herisau, Canton of Appenzell (206, Switzerland), two embroidered muslin dresses, rich cambric handkerchiefs, with other articles of merit.

The Jury make Honourable Mention of the following exhibitors in this department:—

HOLDEGGER, C., St. Gall (195), for embroidered curtain of good design and very effective.

TANNER, B., St. Gall (204), for muslin in the piece, fine and well manufactured.

VONWILLER, ULRIC DE GASF, St. Gall (140), for a variety of low-priced articles, suitable for the foreign market.

BELGIUM.—LACE AND EMBROIDERY.

The Jury award Prize Medals to the following:—

BECK and SONS, Courtray (324, Belgium), for broad and narrow Valenciennes of good fabric.

DEFRENNE, SOPHIE (316, Belgium), for Brussels point handkerchief, of much taste and elegance.

DELEHAYE, A. (305, Belgium), for "application of Brussels" flounce. Real Brussels fall and scarf of good execution.

DUHAYON-BRUNFAUT, and Co., Brussels and Ypres (314, Belgium), for wide narrow Valenciennes laces, in great variety. Rich, real Brussels half-shawl and handkerchief. The wide Valenciennes laces are of surpassing beauty, and unequalled as to quality and design. The Brussels shawl and handkerchief are most elaborately worked, and possess much merit.

HAECK, J. T. (341), for a real Brussels plait veil.

HAMMELRATH, P. H., Ypres (337, Belgium), for Valenciennes laces in great variety and beauty, both in design and quality. One piece, extremely wide for this description of lace, is deserving of much praise.

HEUSCHEN-VAN ECKHOUDT, and Co., Brussels (310, Belgium), for two bobbin Brussels lace dresses, real Brussels fall, guipure handkerchief and cape, &c., excellent designs and quality.

MELOTTE, E., Brussels (302, Belgium), for magnificent piece of gold embroidery of superior work.

NAELTJENS, G., Brussels (308, Belgium), for bobbin Brussels berthe, coiffure lappet, jacket, falls and flounces: the whole a good medium class, and as such possessing merit.

POLAK, F., Brussels (298, Belgium), for designs for black lace, flouncings, scarfs, trimming laces, &c., in good and appropriate taste.

REALIER, Mlle., Brussels (309, Belgium), for Brussels point lace handkerchief, made of flax thread, needle-wrought ground; for beauty, harmony of design, perfect execution, and fineness, this article belongs more to the fine arts than to ordinary manufactures.

SOEKEN, F., Ypres (338, Brussels), for Valenciennes lace handkerchief and lappets—excellent goods.

STOCQUART BROTHERS, Grammont (307, Belgium), for black point lace shawl, scarf, lappets, flouncings, &c.—much merit, taking prices into consideration.

VANDER-KELEN-BRESSON, Brussels (313, Belgium), for Brussels lace handkerchiefs, artistic design: subject, the Royal Arms of England, Glory, Industry, and Justice. Guipure flouncings and berthe of superior quality; with various other articles of much merit.

VAN HALLE, J., Brussels (303, Belgium), for complete set of rich vestments, consisting of chasuble, cope, and dalmatica. Three figures, representing Bossuet, Bishop of Meaux; Fénelon, Bishop of Cambray; and St. Thomas à Becket, clothed in episcopal robes of exquisite embroidery, studded with brilliants. The mitre is adorned with diamonds, rubies, and pearls. The albe is of real Brussels lace.

VAN KIEL SISTERS, Mechlin (333, Belgium), for real Mechlin lace lappets, trimming lace, lace fall, and collar—much merit.

The Jury make Honourable Mention of the following Exhibitors:—

BOUSSON-DE VliegHERE, Bruges (328, Belgium), for two flouncings, imitation of Spanish point lace, of bold and effective style.

DARTEVELLE and MOUNOURY (329, Belgium), for imitation Brussels scarf; Mechlin half shawl, &c.

EVERAERT SISTERS, Brussels (321, Belgium), for black lace shawl, dress, jacket, and veils, good in quality and design.

ROY, C. F. (301, Belgium), for "application of Brussels" flounce; very bold and effective.

ST. JOSEPH, ESTABLISHMENT OF, Verviers (322, Belgium), for Flanders guipure lace flounce, sleeves, and trimming-lace, of excellent quality and good style.

SAXONY.—EMBROIDERY.

The Jury award Prize Medals to the following :—

BACH, G. F. AND SON, Buchholz (158, Saxony), for fancy gimps and silk fringes ; much merit in taste, excellence of execution, and cheapness.

HIETEL, J. A., Dresden (168B, Saxony), for seven tableaux embroidered in hair and silk, in imitation of engraving. The whole beautifully executed, particularly the portraits of the King of Saxony and Her Majesty Queen Victoria.

SCHMIDT, G. F., Plauen (60, Saxony), for set of furniture ; easy chair, pillow, and cushions, window-cushion, wall-basket, table-cover, shades, letter-case, and pincushion, embroidered on muslin ; possessing merit, as showing a new use for embroidery. Designs and work well adapted for the purpose.

SCHREIBER, F. A., Dresden (71, Saxony), for pillow-lace guipure, berthe, barbe, in imitation of ancient lace, both possessing merit.

The Jury make Honourable Mention of the following Exhibitors :—

BOEHLER, F. L. and SON, Plauen (56, Saxony), for embroidered cambric handkerchiefs.

SCHNORR and STEINHAEUSER (62, Saxony), for table-cover of good design and work.

SCHUBERT, Mrs., Annaberg (156, Saxony), for a worked table-cover on net lace, of rich appearance, and ingenious design.

DENMARK.

The Jury award a Prize Medal to—

WULFF, JENS, and SONS, Brede, Schleswig (5, Denmark), for lace collars, cuffs, thread-edgings, and laces ; a good useful class of goods.

TUSCANY.

The Jury award a Prize Medal to—

PARLANTI, E., Borgo a Buggiano (102, Tuscany), for a piece of embroidery in imitation of engraving. Subjects embracing the map of Europe, Napoleon at St. Helena, portrait of Rubens, &c.

SWEDEN AND NORWAY.

The Jury award a Prize Medal to—

HAMRÉN, SOPHIE, Halmstad (28, Sweden and Norway), needlework embroidery, representing the Royal Palace of Ulriksdal, near Stockholm ; extremely well executed.

SARDINIA.

The Jury award a Prize Medal to—

STEFANI, W., Turin (86, Sardinia), for two large silk embroidered tableaux of great merit.

SPAIN.

The Jury award Prize Medals to the following Exhibitors :—

PITER, J., Barcelona (221, Spain), for rich black blonde dress and mantilla, of superb appearance, remarkable for the introduction of coloured flowers, evincing much taste and elegance.

GILART, R., Madrid (237, Spain), for the royal arms of Spain, elaborately worked with coloured silks, having a rich and costly appearance, with the gold and silver on crimson Genoa velvet. The work is beautifully executed, and produces a very brilliant effect. Also some exquisite embroidery on grass-cloth, being the baby-linen made for the late Prince of Asturias.

MARGUERITA, Senora (236, Spain), for rich dress from the fibre of pine-apples, embroidered by hand; very beautiful of its class. Exhibited by HAMMOND, W. P., and Co., London.

The Jury desire to make Honourable Mention of—

G. M. SENORA, Madrid (238), for a fine curiously-embroidered shirt.

HAMBURGH.

The Jury award a Prize Medal to—

GOMPERTZ, B., (33, Hamburg), for hair-embroidered pictures of the Queen and the Prince of Wales, and of the Hamburg Exchange.

AUSTRIA.

The Jury award a Prize Medal to—

BENKOWITS, MARIE, Vienna (389, Austria), for embroidery of crape thread on white silk, representing Beneficence. An embroidery of wool and silk, representing the Grave of the Fallen Soldier.

The Jury make Honourable Mention of—

BAUHOFFER, F., Vienna (388, Austria), for the arms of England embroidered with gold and silver, well executed.

KRICKL, E., Vienna (263, Austria), for a piece of embroidery, the arms of England in gold, silver, and silk, well executed.

RUSSIA.

The Jury make Honourable Mention of the following Exhibitors :—

SHEKHONTIN, ALEXIS, of Novgorod (275, Russia; Prize Medal, Class XX.)

POPINOFF, SOPHIA, of Tiflis (310, Russia; Prize Medal, Class XX.)

NAKHITCHEVAN, Town of (274, Russia).

All for a number of articles in leather embroidered with gold, adapted for caps, slippers, boots, &c., with many other articles possessing both novelty and excellence.

SARDINIA.

The Jury make Honourable Mention of—

TESSADA, F., Genoa (49), for several embroidered cambric handkerchiefs.

GREECE.

The Jury make Honourable Mention of SARIS and RENGOS, Athens, for embroidery in gold.

NEEDLEWORK AND EMBROIDERY.

The Jury award the Prize Medal to the following Exhibitors :—

FAUDELL and PHILLIPS, London (165), for embroidered hangings for a state bed, showing various kinds of embroidery in the curtain drapery, tester, and coverlet. The panel in the foot-board is a copy of the "Aurora" by Guido, very finely executed, from a drawing: for the centre of the head-cloth, a medallion finely worked from a cast, being a successful copy of Thorwaldsen's "Night."

HOULDSWORTH, JAMES, and Co. Manchester (64, Class XIII.), for embroidery by machinery on cloth and silk.

SEEL, G., (Prussia, 657), for ornamental articles, and pictures in hair most artistically executed.

The Jury make Honourable Mention of the following:—

GRÜNTAL, Berlin (166, Prussia), for Berlin patterns for needlework.

HARTREE, E. and G, London (195), for a table-cover embroidered on new silk canvas, the invention of the exhibitor; also, three small pictures in tent-stitch, finely executed.

HELBRONNER, R., London (199), for specimens of a new style of needlework, of good design and well executed.

JACKSON, C., London (84), for *appliqué* embroidery, forming the top of a table; well worked, and in good taste.

JANCOWSKI, W., York (48), for a small picture embroidered in tent-stitch, extremely well done.

MEE, CORNELIA, Bath (51), for banner screen, flags of all nations well arranged and executed; embroidery suitable for borders to curtains or portières, the flowers well arranged and well coloured.

NEIE, F. W., Berlin (168), for Berlin pattern for needlework.

PARRY, C. F. W., Berlin (169, Prussia), for a needlework carpet of good design and well executed.

PURCELL, FRANCES, London (88), for an embroidered table-cover, tastefully designed and coloured, and exhibiting different kinds of needlework.

SCHLEUSS, H., Berlin (160, Prussia), for specimens of embroidery.

SOMMERFELD, B., Berlin (173, Prussia), for an assortment of needlework and embroidered articles.

TOUT, A., Berlin (171, Prussia), for Berlin patterns for needlework.

CARPETS.

In reviewing the existing state of the manufacture of carpets, the first specimens that claim our attention are those from India, Persia, Turkey, and Tunis.

However great may be the differences in quality amongst the carpets from the countries mentioned, they are all made upon the same principle, and that one of great simplicity; but which yet affords the means of producing a more perfect, beautiful, and durable description of carpeting than any other mode of manufacture more recently discovered or introduced.

The manufacture is not carried on in any large establishments; but in pastoral districts, where it is combined with occupations of that nature, and engages a portion of the time of the families employed in that pursuit.

The loom consists of two perpendicular pieces of wood, fixed at some distance apart, which support a beam or roller; at the top, upon which the warp or chain is wound, and about 2 feet from the floor, is another similar beam, upon which the carpet is rolled as it is made.

The work is done entirely by hand, and each tie passes across the face of two warp threads round the back, and has the ends drawn up between them.

When a row of ties has been completed, a shed is formed in the warp, and the shoot is then passed across from right to left, and returned, binding the whole together, and is beat down to a horizontal level by the hand-beaters. Upon this plan carpets of the largest dimensions are made in one piece. The number of shades or colours that can be used is unlimited, and any design can be copied with great accuracy.

The design and colours of several of the carpets from India, Turkey, and Persia are especially worthy of notice, and should be studied with a view to imitate their beauties by the manufacturers of other countries. There is one carpet from Cashmere, sent by GHOLAB-SINGH to the Exhibition, made entirely of silk, that cannot be too highly praised for the beauty of its texture, and the softness and harmony of its colouring. In this carpet there are at least 10,000 ties in every square foot. There are other specimens of carpets of small dimensions, but very beautiful, and remarkable for richness and harmony of colours. The exceptions are where an attempt has been made to copy European designs; and there the failure is as great as is the success in those of the native eastern style.

The carpets from Turkey deserve especial notice, as there are, in addition to those made all in one piece, some in breadths, extremely well coloured and closely woven; and an attempt has been made at new designs with considerable success. The carpets from Tunis and Algiers are made upon precisely the same principle, and have the same peculiar character in colouring and design.

The most costly and magnificent carpets of Europe are made upon the same principle as those above described; and that large and beautiful carpet, sent from the manufactory of the Gobelins to the Exhibition, is made by the same process of weaving as the ordinary Turkey carpets; as also are those from Tournay, in Belgium; Deventer, in the Netherlands; Aubusson, in France; London, Wilton, and Millbridge, in Great Britain. The manufacture at Axminster in Devonshire, and Mirfield in Yorkshire, of this description of carpet, generally called "Axminster," ceased to exist about twenty years ago.

The chief seat of the carpet manufacture in France is the department of Creuze, at Aubusson, Felletin, and Maurissard, where there are probably not less than 5,000 persons engaged in the manufacture of carpets and tapestry.

With the exception of the kind referred to, when describing the carpets from the east, the Aubusson carpets are all made upon the same principle as tapestry, and are consequently too expensive to be purchased by any but the rich. The specimens of Aubusson tapestry and carpets exhibited by Mons. SALLANDROUZE DE LAMORNAIX are especially worthy of notice, being second only to those of the Gobelins and Beauvais. Their merits are not recompensed by a Medal, in consequence of M. Sallandrouze de Lamornaix, as Commissioner for France, having withdrawn from competition.

The manufacture is well represented in the Exhibition, and deserves, for its beauty of design and colours, the highest praise. There is a considerable demand for this manufacture by the noble and wealthy of European nations, and occasionally by the United States. At Turcoin, Nismes, and Amiens, the carpet manufacture is also carried on; there being at these three towns nearly 600 looms; and the production is increasing. One of the features of the Exhibition is the progress made by France in the manufacture of moquette or velvet-pile carpets. This branch is of recent introduction in that country, dating within the last twenty-five years; and the specimens exhibited by Messrs. REQUILLART, ROUSSEL, and CHOCQUEEL, of Paris and Turcoing-Nord, are pre-eminent for their artistic designs and beauty of colouring. Some of the specimens of 5-frame moquette, exhibited by FLAISSIER BROTHERS, of Nismes, are very good. The same manufacture is adapted for floors or for covering furniture; but for the latter purpose, it is made very fine to imitate tapestry, with a velvet surface.

Moquette, Wilton, or velvet-pile, and Brussels carpets, are all woven upon the same principle; the only difference being that in Brussels the wire, by which the pile is raised, is drawn out, and in velvet cut out, by a knife. The pattern is formed by having frames placed over each other, and filled with bobbins of worsted, each frame having for the ordinary width 260 bobbins.

The manufacture of Brussels carpets was first introduced at Kidderminster, about 90 years ago, by workmen brought from Tournay, and has been steadily increasing up to a recent period, when the introduction of Whytock's patent tapestry carpets, together with two other descriptions of carpet, put a stop to its further extension. It cannot be said, however, that the manufacture has been superseded to any extent, as nearly the same number of looms continue to be employed.

The colours in each frame are different, and some of the frames are striped, or planted, as it is technically called, with various colours, when the design to be executed requires it, as in flower patterns, and drawn up by the Jacquard machine now generally used, instead of the old mode of drawing up by hand.

The number of colours, or shades of colour that can be used in a line is limited to the number of frames of worsted, which rarely exceed five in England, but more frequently extend to six or seven in France. Within the last 20 years, three new kinds of carpet have been invented, and brought into extensive use in Great Britain, all of which are well represented in the Exhibition.

The first in order, is Whytock's Patent Tapestry, which has been brought to

great perfection within the last five or six years, and now employs about 800 looms, which are not adequate to supply the existing demand. The peculiarity of this manufacture, is the unlimited number of shades or colours that can be introduced, so that the most elaborately-coloured designs, with flowers and scrolls, can be executed. The saving of worsted is also very important in an economical point of view. The appearance is the same or similar to Brussels carpet, but the manufacture is more simple, each thread being coloured separately at spaces, with the various shades as they follow each other in the design. The process by which this is accomplished is beautifully simple and ingenious, but requires much care in placing and arranging the threads, and putting them on the beam. It is also necessary to the economy of this manufacture, that a large quantity of each design should be made.

This invention was patented about 18 years since, and a renewal of the patent granted for a further term of five years, which expired on the 8th September, 1851.

The specimens exhibited by Messrs. HENDERSON and WIDNELL, and Messrs. CROSSLEY and SONS, show in an eminent degree the capabilities of the manufacture as regards design and colouring.

The next is the "Patent Axminster" of TEMPLETON and Co., of Glasgow, of which there are some excellent specimens exhibited in carpets, rugs, and table-covers.

The object of this invention was to give the beautiful appearance of Axminster, or Tournay, at less cost; and it has been very successfully and extensively applied to the manufacture of rugs, as well as carpets.

The last is a description of carpet, having the same appearance as Brussels, or tapestry, which is woven plain by steam power, and afterwards printed by the same agency.

It is woven at Rochdale by Bright and Co., under Sievier's patent, and printed near Macclesfield, by Burch and Co., by a machine invented and patented by Mr. Burch. This manufacture has already found large sale, more especially for exportation.

Another novelty in the Exhibition is a carpet, rugs, and hangings for walls, of patent wool mosaic, the carpet and rugs being well executed, and the surface or pile peculiarly close. As yet, there has not been sufficient time to see what position this manufacture is likely to take in the carpet trade.

The rapid extension of the carpet manufacture in Great Britain is proved by the fact, that within the last seven years, not less than 700 additional hand-loom have been put in operation, for one of the new fabrics referred to; and looms worked by steam-power, equal to the production of 300 hand-loom for another, without lessening the demand for former fabrics, being an increase of full 30 per cent. in seven years.

Not only has the home consumption greatly increased, but new foreign markets have been opened, and old ones extended.

Several patents have recently been taken for the application of steam-power to carpet weaving, in addition to that referred to of Sieviens, and no doubt now exists, of this having been successfully accomplished; at all events, for weaving patent tapestry carpets, if not for Brussels of the usual manufacture. This will

tend to reduce the price, and, consequently still further stimulate consumption. In fact, there is scarcely any branch of our manufactures, that wears a more promising aspect for the future.

The principal seat of the carpet manufacture is Kidderminster, in which there are about 2,000 looms, chiefly occupied in weaving Brussels carpets; while the carpets called "Kidderminster" are made extensively in the neighbourhood of Glasgow, Kilmarnock, Bannockburn, and Aberdeen.

They are also made in Yorkshire, Durham, Lincolnshire, and Westmoreland; the largest carpet manufactory in Great Britain being at Halifax.

The number of looms of all kinds may be estimated at 4,000, and the value produced at upwards of 1,000,000*l.* sterling.

The average earnings of the operatives will vary from 16*s.* to 28*s.* per week.

The specimens of carpeting from Austria, Portugal, Sardinia, and Prussia, show that the manufacture is making progress in those countries, and is evidence of a growing taste that must ultimately lead to a large increase of consumption on the Continent of Europe.

The numerous exhibitors of Berlin work and their contributions, show that this is still a fashionable occupation among our fair countrywomen, and in addition to those who follow it for amusement, affords employment to a large number of females.

Some of the specimens exhibited are very beautiful; in fact, every description of needlework may be said to be well represented in the Exhibition, and one specimen worked from a cast, and another from a drawing, without the aid of ruled paper, exhibited by FAUDEL and PHILLIPS, are especially worthy of notice.

A specimen of tapestry by a lady (Mrs. ALDERSON) is also highly creditable to the taste and ingenuity of the exhibitor.

The contributions in embroidery of various kinds from India, Turkey, Tunis, and Persia, are extremely interesting, beautiful in taste, and displaying the highest degree of excellence in execution.

SUPPLEMENT.

SINCE the Jury closed their labours and separated, some specimens of Brussels and cut-pile carpeting, that merit particular attention, have been placed in the Exhibition by Mr. BIGELOW of the United States, and by Mr. FAWCETT of Kidderminster, as well as by Messrs. JAMES HUMPHRIES and SONS of Kidderminster.

The specimens of Brussels carpeting exhibited by Mr. Bigelow, are woven by a power-loom invented and patented by him, and are better and more perfectly woven than any hand-loom goods that have come under the notice of the Jury. This, however, is a very small part of their merit, or rather of that of Mr. Bigelow, who has completely triumphed over the numerous obstacles that presented themselves, and succeeded in substituting steam-power for manual labour in the manufacture of five-frame Brussels carpets. Several patents have been taken out by different inventors in this country for effecting the same object; but as yet none of them have been brought into successful or extensive operation, and the honour of this achievement, one of great practical difficulty, as well as of great commercial value, must be awarded to a native of the United States.

A similar result is on the eve of being accomplished in this country; and two manufacturers are preparing under different patents to weave Whytock's patent tapestry carpeting by steam-power. This, however, is much more easily accomplished than to weave five-frame Brussels carpets by the same means. The first loom for weaving Brussels carpets by steam-power was the invention of Mr. W. Wood, and patented in 1842; but the feeling of those engaged in the manufacture at that time, being hostile to any change in the then existing state of the manufacture, no attempt was made to introduce it, and many asserted that it was impossible, or if possible that no advantage would result from it.

The error of this opinion is demonstrated by Mr. Bigelow, whose loom will weave 20 yards per day on the average, including stoppages, and requires only the attention of a boy or girl; while the hand-loom will produce on the average only five yards per day, and requires in addition to the weaver, the assistance of a boy or girl to draw out and put in the wires by which the pile is raised.*

Besides the great economy in labour, there are other advantages. The goods are woven with more perfect regularity, and by means of an invention for weighting the bobbins equally, and at the same time more heavily, the tension of the worsted being thereby increased, a smoother and more even surface is produced, and by the same means a saving in the material effected.

There are in the United States, 28 of Mr. Bigelow's looms at work upon five-frame Brussels carpeting, 50 upon tapestry carpeting, and 450 upon ingrain carpeting (as it is called in the United States), the same description being called Scotch, Kidderminster, or super carpet, in this country.

The invention of Mr. Fawcett is of a different nature, but also important in its results. In Bigelow's, the main feature is a saving in the cost of labour, in Fawcett's a saving of material. The specimen exhibited is cut-pile, but there is little doubt of the principle being applicable to Brussels carpeting also.

As Mr. Fawcett has a patent in progress, the results only and not the mode by which they are obtained are here noticed.

In Brussels carpet made with five frames of worsted, the proportion on the surface is as 5 to 8, and in cut-pile of average quality as 6 to 8 of the whole quantity used. By Mr. Fawcett's mode of weaving, the very important saving of one-half of the worsted that is at the back of the carpet is effected, without diminishing the quantity on the surface. The weaving is also more easy and somewhat cheaper; and another advantage is, that ten-frame will be woven as easily as five upon the method hitherto in use; thus affording an immensely-increased facility for the improvement of design, and the introduction of additional colours to give proper effect to them.

There is little doubt that Mr. Bigelow's loom can be applied to Mr. Fawcett's invention as well as that of Messrs. Humphries and Sons' improvement, and these two plans combined will produce a much more beautiful fabric than has hitherto been made, at a greatly diminished cost.

The Jury of Class XIX., conjointly with that of Class XXX., have awarded

* To prevent misapprehension, it is perhaps necessary to state, that the ingenious invention of M. Sievier, for weaving carpets and other terry fabrics *without* a wire, is in extensive operation for the manufacture of the *plain fabric* to be printed in the piece.

the GOVERNMENT MANUFACTORY OF GOBELIN AND BEAUVAIS TAPESTRY the Council Medal for the originality and beauty of design of the different specimens exhibited for furniture, and the extraordinary excellence of execution of most of the productions exhibited.

The Jury award Prize Medals to the following subjects :—

BRAQUENTÉ and Co., Paris (435 France), for Aubusson carpet, tapestry, portières, and table-covers; good designs, colouring, and execution.

BRINTON and SONS, Kidderminster (110), for specimens of patent tapestry carpet, velvet pile, and Axminster rugs.

BURCH, J. and Co., Crag, near Macclesfield (115), for specimens of velvet-pile and Brussels carpets, woven by steam-power, and printed; also a fine quality of the same material for hangings.

CASTEL, E., Aubusson (Creuse), (83, France), for Aubusson carpet of fine quality, tapestry-panels, or portières, extremely beautiful, and very finely executed.

CRACE, J. G., Wigmore Street (530, Class XXVI.), for specimens of Brussels and velvet-pile carpets. The design is unique and well coloured, the style mediæval.

CROSBLEY and SONS, Halifax (142), for the great beauty of their patent wool mosaic rugs and table-covers, in design and colours, and also their perfect execution. For the design, colours, and execution of the carpet of the same manufacture, and also for its being the first large carpet ever made upon this principle, and for the designs and colours of the specimens of Whytock's patent tapestry carpets.

DINGLINGER, A. F., Berlin (175, Prussia), for sofa carpets well designed and executed, and for cloths.

DOVE, C. W., and Co., Leeds (155), for specimens of five-frame Brussels carpet, of good bold design, and well coloured; also a specimen of five-frame velvet pile of good design and colours.

FLAISNIER BROTHERS, Nîmes (Gard), (204, France), for moquette or velvet-pile carpets, and fine moquette for chairs, &c.

HARRIS, G. and Co., Stourport (192), for three specimens of velvet-pile carpet, ten frames; excellent in quality.

HENDERSON and WIDNELL, Lasswade (201). Specimens of fine tapestry, velvet for table-covers and portières, patent rugs, and Whytock's patent tapestry carpets. The patent rugs are almost a new article, and as beautiful as any hitherto produced at double their price. The first large carpet of centre design ever made upon the principle of Whytock's patent, showing a very ingenious application of it at a small increase of cost. For the merit of the designs and colours of the patent tapestry carpets, especially the dark grounds, which are well executed.

KROONENBURG, W. F. Royal Carpet Manufactory, Deventer (43, Netherlands), for a large carpet of Persian style, of good quality, and well coloured.

LAPWORTH, A. (232), for specimens of velvet-pile carpet, one of which is a very good design, and well coloured. Axminster carpets, very fine in quality, also patent Axminster carpet of Persian design.

NEWCOMB and JONES, Kidderminster (257), for a velvet-pile carpet ; an excellent specimen of colouring and shading, with the use of only five frames.

OVERMAN and DELEVIGNE, Tournai-Savonnerie (297, Belgium), for Tournai-Savonnerie carpet, of very fine quality ; carpets of the same manufacture, in imitation of Smyrna carpets ; velvet-pile carpets, centre design and bordered.

PARDOE, HOOMANS, and PARDOE, Kidderminster (263), for several specimens of velvet-pile carpets, on Whytock's patent principle. Patent Berlin rugs.

REQUILLART, ROUSSEL, and CHOCQUEEL, Turcoing (Nord), and 20 Rue Vivienne, Paris (1433, France), for moquette, or velvet carpet, excellent in design and colours ; also fine moquette for furniture, and Aubusson tapestry.

SMITH (TURBERVILLE), BOYLE, and Co., 9 Great Marlborough Street, London (318), for patent tapestry carpets, excellent in design and execution.

TEMPLETON, JAMES, and Co., Glasgow (315), for several patent Axminster carpets of good designs, and well coloured. Also rugs and table-covers of the same manufacture.

VICTORIA FELT CARPET COMPANY, Love Lane, Wood Street, London (327), for a specimen of printed felt carpet, combining utility and cheapness.

WATSON, BELL, and Co., 35 and 36 Old Bond Street, London (337), for Axminster carpet of first-rate quality, good designs, and well executed. Bordered Brussels carpet, of Persian design, with centre, extremely good and well coloured.

WHITWELL, J., and Co., Kendal (345), for specimens of Kidderminster carpet, and twilled Venetian carpet, of great utility and cheapness, well designed and coloured.

WRIGHT, CRUMP, and CRANE, Kidderminster (358), for a velvet-pile bordered carpet, five frame ; a Brussels carpet, Persian design ; a Brussels carpet, shades of crimson and oaks, &c.

ZUPFINGER, T., Waeundorf, Canton of Zurich (Switzerland, 209). For his invention in weaving chenille into carpeting, by which the outline of the design is more correctly given.

The Jury make Honourable Mention of the following :—

BROWN, M'LAREN, and Co., Scotland (114), for specimens of velvet carpet, and three-fly Scotch carpet.

DAUFRIAS, B., and Co., Portugal and Madeira (853 and 881), for two very good specimens of Kidderminster carpets.

DUCHÉL and SON, Amiens (France), for a moquette carpet, centre design and bordered.

HAAS and SON, Vienna (Austria, 619), for a considerable assortment of moquette carpets ; good both in colours and design.

HENDERSON and Co., Durham (200), for very good specimens of damask Venetian carpet, and velvet-pile stair-carpet.

HUMPHRIES, THOMAS, Kidderminster (210), for a seven-frame velvet-pile carpet, of good quality and design, and well coloured.

LADIES' CARPET NEEDLEWORK (379), for the design by Mr. Papworth.

LARQUE, SONS, BROTHERS, and JAQUEMET (901, France), for Aubusson carpets of good design and colouring.

LAWRANCE, A. and A., and Co., United States (453), for a specimen of Kidderminster carpet of excellent quality.

LECUN and Co. (1306, France), for Tapis Ecosais, good in quality and design.

MORTON and SONS (252), for several specimens of velvet-pile carpets.

NEWTON, JONES, and WILLIS, Birmingham (258), for specimens of church carpets and hangings, and episcopal robes.

REY BROTHERS (35, Sardinia), for specimens of thick coarse carpeting, of good designs.

SIMCOX, G. P. (London and Kidderminster) (302), for specimen of three-thread Brussels carpet, exhibited for cheapness.

WILSON, J. and W., Scotland (351), for specimens of Kidderminster (or Scotch) carpets.

WOODWARD, B. HIGGINS, Kidderminster (354), for five-frame Brussels carpet, centre design, and bordered, with other specimens.

Floor-cloths.

The Jury award Prize Medals to the following Exhibitors:—

ALBRO and HOYT, Elizabeth Town, New Jersey (United States, 183), for specimens of floor-cloths, excellent both in quality and colours.

BURCHARDT and SONS, Berlin (164, Prussia), for printed moleskin table-covers, floor-cloths, and painted window-blinds; a very large and good assortment.

HARE, JOHN, and Co., Bristol (190), for four large specimens of oil-cloth, the designs, colours, and qualities of which are first rate.

JOZEZ, jun., Brussels (306, Belgium), for printed moleskin table-covers, of great variety and cheapness; floor-cloths, and waterproof fabrics of great excellence.

LE CROSNIER, — (1305, France), for table-covers, varnished and printed, on cotton, moleskin, imitation patent leather, and imitation flock.

ROELLER and HUSTE, Leipzig (161, Saxony), for painted table-covers, and floor-cloths; generally good in designs, and well executed.

SEIB, J. A., Strasbourg (1009, France), for enamelled floor-cloth, waterproof fabrics, toiles and cotton; excellent in quality.

The Jury make Honourable Mention of the following:—

BARNES, R. Y., floor-cloth manufacturer (95), for three specimens of oil-cloth, well designed, and good in quality and colours.

BISIEUX, Paris (767, France), for oil-cloth, painted imitation of marble and wood on moleskin.

IMM FERDINAND (46, Grand Duchy of Hesse), for printed and painted moleskin table-covers, of good designs, and well executed.

LEHMANN, M., Berlin (Prussia, 167), for painted moleskin table-covers and floor-cloths, of great variety.

SMITH and BABER, London (371), for one large specimen of oil-cloth.

In concluding the Report accompanying the decisions of the Jury, I have to acknowledge the kindness of—

Robert Lindsay, Belfast, for that portion relative to the Irish and Scotch embroidery.

D. Biddle, Oxford Street, London, for English and Belgian hand-made lace.

Felix Aubry, Paris, for French lace and embroidery.

— Faessler, London, for Swiss embroidery.

P. Graham, London (Vice-Chairman), for carpets and tapestry.

JURORS.—The following Exhibitors being upon the Jury, all notice of the articles exhibited by them has been omitted :—

RICHARD BIRKIN, of Nottingham, machine-made lace.

D. BIDDLE, of London, hand-made lace.

P. GRAHAM (Jackson and Graham, London), carpets.

RICHARD BIRKIN, *Reporter*.

July 1851.

CLASS XX.

REPORT ON ARTICLES OF CLOTHING FOR IMMEDIATE PERSONAL OR DOMESTIC USE.

Jury,

WILLIAM FELKIN, Mayor of Nottingham, *Chairman*, The Park, Nottingham;
Lace Manufacturer.

PHILIPPE WALTHER, *Deputy Chairman*, Switzerland.

T. CHRISTY, *Reporter*, 35 Gracechurch Street; Beaver and Silk Hat Manufacturer.

F. BERNVILLE, France.

T. BROWN, 40 Wood Street; Straw Hat Manufacturer.

ELLIOTT CRESSON, United States.

— HÜLSSE,* Zollverein.

E. SMITH, 60 Old Broad Street, City; Clothier.

* E. BLANK, Merchant, 10 Trump Street, Cheapside, Proxy for M. Hülsse.

Associates.

ROBERT DIXON BOX, 187 Regent Street; Boot and Shoe Maker.

E. BLANK, 10 Trump Street, Cheapside; Merchant.

WILLIAM BURCHETT, 29 Cheapside; Merchant.

ALEXANDER CUMMING, 104 Fore Street, City; Warehouseman.

SEYMOUR HADEN, 62 Sloane Street, Chelsea; Surgeon.

SAMUEL HODGKINSON, 43 Threadneedle Street, City; Hosiery and Glover.

WILLIAM MACLAREN, 55 Cernhill; Boot and Shoe Maker.

JOHN BAPTISTE SOLDI, Southwark.

THE extreme variety of the articles submitted to the inspection of this Jury rendered it a task of no small difficulty accurately to appreciate them; and when it is remembered that textile fabrics, or other substances suited for such purposes, have been exhibited, from every part of the world, wrought up into "*articles of domestic or personal use*," suited to the habits of the various nations by whom they may have been contributed, too much praise cannot be bestowed upon the industry and perseverance of the numerous exhibitors, who at vast cost have responded to the invitation, and have sent very valuable, and in many instances, highly suggestive contributions to "*The Exhibition of the Industry of all Nations*."

HOSIERY.

In 1589, the hosiery knitting trade originated through the invention of the stocking-frame by the Rev. W. Lee, at Nottingham. It is carried on in Nottinghamshire,

Derbyshire, and Leicestershire, at Godalming, and at Tewkesbury in England; at Balbriggan in Ireland; and Hawick in Scotland; at Chemnitz and its neighbourhood, in Saxony; at Paris, Gauges, Avignon, Orange, &c., in France. Stocking frames are spread over almost every district of France, Spain, Netherlands, Germany, and Italy: these serve for the production of hosiery, chiefly used in the neighbourhood of the machines. Goods for sale, knitted by hand, are made in Kendal, Aberdeen, and the Shetland Isles, &c. England exports all kinds of hosiery; France chiefly silk hosiery; Saxony exports are for the most part low-priced cotton and woollen hosiery. According to an exact census taken by Mr. W. Felkin, of Nottingham, in 1844, there were, at that time, 48,482 stocking-frames in the United Kingdom. The annual return from them was 2,565,000*l.*, or thereabouts. This consisted of 305,000*l.*, imported raw materials, and 400,000*l.*, of home growth: 1,350,000*l.*, paid for wages; and 510,000*l.* for finishing and profits. Wages were then at a deplorably low rate, and had been so for the previous 35 years. Since 1844, the number of machines has been increased to at least 50,000; raw materials have advanced 30 to 60 per cent.; wages have risen about 40 per cent.; and profits have accumulated in proportion. The returns of the hosiery trade of the United Kingdom in the last year were probably about 3,600,000*l.*; and it is satisfactory to have to state, that the export trade is extending to all parts of the world; but the chief increase in demand has been for home consumption, amongst the most numerous classes of the community. The number of English hands employed in this manufacture either constantly, or as an addition to domestic duties, is when trade is good about 100,000, consisting of a nearly equal number of each sex. Until a few years since, frames were entirely worked by hand in the dwellings of the artisans. They are now slowly collecting into factories, in a few of which steam-power is applied to rotary machinery. A rotary frame stands in the English compartment of Machinery in Motion in the Exhibition; and two others in the French collection of machinery. These may well be compared with the stocking-frame upon Lees', *i. e.*, upon the usual construction, one of which is at work amongst the English machinery. There are, however, (not exhibited,) three other very important patented frames, each securing different degrees of speed or facility of production. The most rapid of these is capable of being worked by a youth, and of producing in a week as many frame-work knitted socks as can be cut and sewn up into 75 to 100 dozens of small women's-hose. A specimen of these bleached cotton stockings is in the Exhibition, weighing 14 ozs. per dozen, and offered at 2*s.* 2*d.* per dozen ready for the market. This is certainly one of the most remarkable instances of the power of improved machinery to cheapen production ever seen. The lowest price of English cut-up cotton hose made from the old wide frame, which is shown in the Exhibition, is 3*s.* 7*d.* per dozen, weighing 17½ ozs.

The colours dyed in Nottingham do not generally equal those of the coloured cotton and silk goods dyed for the London, Manchester, and Coventry trades. This deserves the serious attention of the dyers and manufacturers in that locality. Improvement is certainly practicable, as there is water in the district well adapted for securing brilliancy of colour. The bleach and finish of *Nottingham cotton hosiery* is unequalled. Leicester hosiery is surprisingly diversified in colour, shape, and adaptation of the articles to every market. One house sends to the

Exhibition specimens sufficient to represent fairly their own production, comprising 12,500 articles and prices, employing about 4,000 hands, and distributing about 1,400*l.* weekly in wages. This spirit of adaptation and improvement in machinery, and diversifying its products to suit the wants of the world, pervades the Leicester trade; and has resulted in the population of that borough being quadrupled in 40 years; having risen from 16,000 to 64,000. No means are available for ascertaining the extent of hosiery production in France. French cotton hosiery is generally of uneven materials; but their silk hosiery is of superior materials. The machinery is in less perfect order than that of the English. The chevening of their embroidered hose is very beautifully designed and executed. In the Saxony Catalogue of goods in the Exhibition, their machines are stated to be about 30,000, employing 43,000 hands. Their lowest specimen of cut-up small women's hose is at 3*s.* 6*d.* per dozen, weighing 18½ ozs., half hose 1*s.* 10*d.*, and cotton gloves 1*s.* 6*d.* per dozen, all made no doubt with a view to exportation. This trade has been remarkably rapid in its progress, having risen from a trifling amount to its present extent within the present century. Saxony hosiery as compared with English is, from the machinery being too often in an imperfect state, liney, short-looped, and, therefore, finer for gauge; but less elastic and less durable from the same cause. There is less substance in hand than, from the actual weight of materials used, there ought to be. The materials are less even in quality than those employed in the English trade. Honourable Mention has been occasionally spoken of in the following recommendations, as suitable for the meritorious workpeople referred to, and in a few instances for exhibitors who have aided the completeness of this Class. It will be observed, that no recommendation is offered for the Council Medal. The Jury do not think any of the productions exhibited present originality or inventive power justifying the award of that medal. But the merit of promoting excellence of quality, diversity of useful products, low prices of goods suitable for the mass of consumers at home and for exportation, and consequent increase of employment, has been eminently exhibited in this Class.

The Jury award Prize Medals to the following Exhibitors, and for the subjects indicated:—

ALLEN and SOLLY, Nottingham (100), for sound and well-made articles, and a selection showing the improvement in the hosiery trade, especially in the materials used at the dates 1700, 1790, 1804, 1810, 1812, 1815, 1826, and 1848.

ANGRAVE BROTHERS, Leicester, Manufacturers (202), for drawers and shirts of excellent quality.

BIGGS, H. W. and SONS, Leicester, Manufacturers (205), for the general excellence of the specimens of hosiery, adapted to every market where worsted and low-priced cotton stockings, gloves, and woollen shirts are in demand.

BILLSON and HAMES, Leicester, Manufacturers (201), for the excellence in quality of Thibet wool, and a great variety of socks.

CARTWRIGHT and WARNERS, Leicester (196), for worsted yarns prepared by them from Merino and Vigonia wools, and for general excellence of the articles manufactured therefrom.

COCHOIS and COLIN, 7 Rue des Dechargeurs, Paris, France (124, France), for good quality and embroidery.

FRY, J., Godalming (193), for Lisle thread hose of excellent make, and very regular materials, and for well-finished Segovia goods.

GLAESER, J. S., jun., N. Chemnitz, Saxony (72, 83), for women's coloured cotton gloves.

HARRIS, R., and SONS, Leicester, Manufacturers (198), for an extensive collection of examples of hosiery of every kind, adapted to the most varied markets, for superior excellence in production, alike as to pattern, colour, and finish, and as a recognition of the encouragement of inventions and adaptations of machinery in the manufacture of hosiery.

HOLLAND, T., and Co., Godalming (194), for fleecy hosiery, having special reference to medical uses, and the comfort of invalids, and for Merino and Segovia goods of the most superior quality.

HURST and SONS, Nottingham (99), for the excellence of a general assortment of articles suitable for the home and export trade.

LANDGRAFF, GOTTFRIED, Hohenstein (Saxony, 72, 83), for women's single-thread cotton-hose.

LAURET BROTHERS, 19 Rue des Mauvaises, Paris and Gauges (903), for embroidered silk-hose of very high quality; also for embroidery in colours and general excellence of production.

MCDUGALL, D., Inverness, Scotland (83), for knitted hosiery, &c., and as a recognition of his efforts to create habits of self-dependence, and a love of labour amongst the peasantry of the Highlands of Scotland.

The Jury consider that this exhibitor is entitled to this distinction as much for the superiority of the articles he exhibits, as in consideration of the circumstances under which they are produced. The peasants of Argyllshire, Ross-shire, &c., are afforded employment in knitting while attending flocks, and during other desultory employments. Cotters, once half starved, he states, now possess money, thus earned, placed in the savings-banks. The wool is cleaned, combed, and prepared by the peasants; dyed by themselves, where colours are desired; brown, from a lichen called *crothol*; yellow, from the tops of young heather; black, from alder bark; lemon, from furze flowers; and olive, from the roots of the water-lily. All these substances are at hand and well known to them. Stockings, and socks of various patterns and qualities thus knitted from home-dyed or self-coloured wools, are exhibited, as well as pieces of Tweed, woven from the same materials. This exhibitor pays 300*l.* to 500*l.* per annum for socks alone, and all this class of products are exported to Hong Kong, Shanghai, and other distant parts, at from 12*s.* to 24*s.* per dozen pairs, besides being used in Scotland itself somewhat extensively. The Jury desired to have recognised the first preparer and dyer of wool, together with the best and most thrifty knitter, had it been possible to have ascertained this with accuracy.

McKENZIE, W. B., 126, Prince's Street, Edinburgh (142), for Shetland knitted shawls and hose. The former are of very fine materials.

MEINERT BROTHERS, Oelsnitz, Saxony (72, 83), for woollen shirts of excellent make and good colour, for exportation.

MEYRUEIS and SONS (639, France), for extra fine white embroidered silk-hose, and excellence of ankle embroidery in colours.

MILES, S., Bunhill Row, London (89), for an extensive collection of articles of dress.

MILON, P. D., sen., 98 Rue St. Honoré, Paris, France (930, France), for superior workmanship of hose, and for excellence of embroidery.

MORLEY, J. and R., Nottingham and London (101), for great excellence in the manufacture and finish of silk and cotton hose, suited to the best demand of the London and other markets, and for silk gloves of superior make, colour and finish. The exhibitors send from the coarsest to the finest gauges in silk and cotton hose, the latter requiring a considerable magnifying power to discern the loops, and though a dozen of the silk hose weigh only 3½oz., they are perfectly made in quality, and of the most regular materials. The silk in each pair cost 1s. 3d., the workmanship 15s.

NACKE and GEHRENBECCK, Chemnitz (Saxony, 72, 83), or women's cut-up white cotton-hose of fine quality.

NEUBER, F., Chemnitz (Saxony, 72, 83), for white and brown cotton hose, adapted to exportation from their low prices.

NEVILL, A., and Co., 121 Wood Street, London (20), for excellence of production in ladies' under-clothing, to fit the shape, and gentlemen's pantaloons and drawers of similar character; also for excellency of quality and make of Saxony wool shirts, and hose manufactured for the Spanish and other markets.

SOLBRIG, F., Chemnitz, (Saxony 72, 83), for adaptation in price to export demand in certain qualities of hosiery.

TAYLOR and Co., Rochdale (127), for plushes manufactured from waste silk, and the use of that material which is of comparatively small value for the manufacture of articles of general utility.

THRESHER and GLENNY (79), for a fabric for under-clothing in warm climates.

THURMAN, PIGOTT, and Co., Nottingham (92), for a good collection of self and parti-coloured patent floss and floss-velvet gloves, of very superior dyes. The former are flossy within, and run in with the needle after the fabric is made; the latter have the velvet pile outside the glove.

WARD, STURT, SHARP, and WARD, Belper, Derbyshire (195), for examples of nearly every class of stockings and gloves, made from silk or cotton yarn, of great excellence, whether as to make, colour, or finish, or adaptation to various markets; and also for the lowest sample of cut-up hose in the Exhibition.

WEK and LINDNER, Chemnitz (Saxony, 72 and 83), for hosiery of great excellence, suitable for general use.

WILSON and SON, Balbriggan, Ireland (183), for excellent thread hosiery, with lace fronts.

The Jury make Honourable Mention of the following Exhibitors:—

BIDDLE, JOHN, Leicester, Manufacturer (207), for warp in hares'-fur, and Saxony wool goods, spun silk, cloth, hares'-fur gloves, and Vicuña wool articles.

CORAU, H., and SONS, Leicester (208), for the very creditable character of their contributions.

HADDEN, A., and SONS, Aberdeen, Manufacturers (134), for specimens of dyed wools in every shade of colour.

HUDSON, JAMES, Leicester, Manufacturer (199), for good Wigonia hosiery, black worsted hosiery, and an imitation of Shetland half-hose.

LART, JOHN, and SON, Nottingham, Inventor and Manufacturer (81), for articles of clothing fashioned to fit the bust and waist of the wearer, and registered gusset to band, 70G lace insteps of No. 200 yarn. The workman who made the latter article also deserves commendation.

MUSSON, R. and J., Nottingham, Manufacturers (97), for superior plaited gloves, and good plain silk gloves.

POPE and PLANTE, 4 Waterloo Place, Pall Mall, London, Manufacturers (6), for surgical elastic belt, sock, &c.

SHAW, JOHN, Radford, near Nottingham (91), for his application of the principle of the Jacquard to the stocking frame.

WHEELER, T., and Co., Leicester (206), for the application of the stocking frame to weaving shawls.

The Jury also make Honourable Mention of JOHN RICHARDS, jun., Riste Place, Nottingham, the maker of the silk hose, No. 1000, exhibited by Messrs. J. and R. MORLEY, for the great skill displayed therein.

BOOTS AND SHOES.

Boots and shoes have been exhibited manufactured from almost every description of material, and from most parts of Europe and the United States; in some instances great novelty of construction and adaptation have been manifested, but we have chiefly to remark upon the greater or less amount of skill attained, in producing an article of fashionable use.

On a review of the whole of the boots and shoes of every class and description exhibited to the Jurors, the conclusion arrived at is, that the improvements which have been made during the last five or six years by the English manufacturers have enabled them to compete with the foreign; the introduction of foreign leather since the alteration of the tariff a few years back, as well as foreign boots and shoes at a lower rate of duty, has had the effect of rousing the energies of the English manufacturers, and of calling forth the requisite talent to bring about the results before alluded to; and not the least remarkable part of the question is the fact, that the increase in the consumption of English boots and shoes has not been less (in the period before named) than 20 per cent.

From France, it must be observed, that in many cases, exhibitors have shown goods remarkable for qualities more esteemed in the country for which they are required than in our own; and such goods must not be regarded entirely with an English eye.

The Jury award Prize Medals to the following exhibitors:—

ADDINGTON, W. H., Norfolk, Virginia, United States (471), for very strong shoes for mining purposes.

ATLOFF, J. G., 69 New Bond Street, London, Inventor (32), for a novel and economic plan of cutting, by which a short boot can be made at nearly the same cost in material as a shoe.

BATHIER, V. (Creuse), France (22, France), for novelty and cheapness in the production of wooden shoes, with leather applied to the top of the soles; and for the taste displayed in the manufacture.

CHRISTL, J., Vienna (327, Austria), for strong and excellent workmanship.

CLARKE, CYRUS and JAMES, Street, near Glastonbury, Inventors and Manufacturers (48, Class XVI.), for elongating goloshes, elastic insertions on the instep, both useful and novel, and an excellent assortment of ladies' shoes in various styles.

DESCHAMPS, N., 14 Galerie d'Orleans, Palais National, Paris (1185, France), for his plan of cutting without a block front in one piece of leather.

DUFOSSÉE, sen., 13 Rue St. Dominique, Paris (1200, France), for solid and excellent work. The Jury consider that Honourable Mention ought to be made of the workmen who produced the best.

DUFOSSÉE and MELNOTTE, 20 Rue de la Paix, Paris (1201, France), for excellence of workmanship in boots and shoes. Honourable Mention is also due to the workmen who produced the best articles.

GILBERT and Co., 13 Old Bond Street, London (179, Class XVI.), for riding-boots, of excellent manufacture, produced with great care and attention.

GROSKOPF, GEORGE, Vienna (343, Austria), for strong and good boots and shoes, of excellent workmanship.

HEFFORD and EACER, Derby (150, Class XVI.), for glazed Wellington boots, of excellent workmanship, elaborately and beautifully "stabbed." Honourable Mention is also due to the workmen who produced them.

HICKSON and SONS, 20 West Smithfield, London, Manufacturer (192, Class XVI.), for general excellence of the lighter kind of export and other goods.

HOOK, JOHN, 66 Bond Street, London, Manufacturer (114, Class XVI.), for the superior workmanship, great excellence, and beauty of ladies' shoes.

JEFFERS, W. H., 467 Broadway, New York (116, United States), for a case of ladies' boots and shoes, of exquisite workmanship; the Prize Medal to be awarded to the workman, and Honourable Mention to the manufacturer.

KUNERTH, ANTON, Vienna (333, Austria), for magnificent slippers in the Turkish style, of excellent work and elegant appearance.

LEFEBURE, J. P., 14 Rue du Paradis Poissonnière, Paris (578, France), for a remarkable invention for making boots and shoes by means of brass screws, the work being pressed together by an extraordinary pressure, thereby preventing damp from entering. There are, also (by the same exhibitor), other mechanical contrivances for cutting out the various parts of boots and shoes, combining great novelty and utility.

MASSEZ, —, 24 Rue Aubyle Boucher, Paris (1347, France), for excellence of production, relative to price, the articles being at once cheap and well made.

MEIER, F., 17 Rue Franellet, Paris (1352, France), for the great excellence of the workmanship of ladies' shoes, and beauty of finish. The Jury, also, desire to make Honourable Mention of the workman or workmen who executed them.

MOHR, W., Berlin (186, Prussia), for clogs of light and elegant quality, and for kid boots.

PARKER and SONS, Northampton, Manufacturers (116, Class XVI.), for general excellence.

PARKER, J., 35 Dame Street, Dublin, Manufacturer (242, Class XVI.), for excellence of work in strong boots, and the great care evinced in the light boots. It is desired to make Honourable Mention of the workmen who produced the stout work.

PEFLOW, W., Browning Street, Stafford (157, Class XVI.), for workmanship of a high character, and the application of an elastic spring.

POIRIER, P., Châteaubriand (Loire Inférieure), France (1398, France), for the excellent quality and make of self-coloured leather boots, for very hard wear. These articles are highly esteemed in France, and fulfil the peculiar requirements of the market for which they are made.

POPINOFF, SOPHIA, of Tiflis (310, Russia), for shoes, slippers, and other articles of usual and useful wear. The Jury also desire to make Honourable Mention of three workmen.

SHEKONIN, ALEXIS, Government of Novgorod, town of Novotorjok (275, Russia), for embroidered boots and shoes, and other goods, of the highest class of workmanship in boots.

THIERRY, C. A., 301 Rue Gré, Paris (391, France), for gentlemen's boots of great excellence. The Jury desire to make Honourable Mention of the best workmen, by whose skill these were produced.

THOMAS and SON, 36 St. James' Street, London, Manufacturers (211, Class XVI.), for high-class workmanship in boots.

WALSH, WILLIAM, 7 Buckingham Place, Fitzroy Square, London, Manufacturer, (207, Class XV.), for welted cork soles of high merit as to workmanship.

WEMMER, J. (3, Luxemburg), for the excellent quality of shoes for labouring men, and for cheapness, and a novel principle in the nailing.

The Jury make Honourable Mention of the following Exhibitors:—

ADOLPH, C. F. W., Berlin (172, Prussia), for a case of well-made ladies' boots and shoes.

ALLEN and SON, Pembroke, Wales, Manufacturer (149, Class XVI.), for a stout-made boot.

BEARN and JEFFS, Parade, Northampton, Manufacturer (118, Class XVI.), for "stabbery" of the very highest class. The workman who executed it is deserving of Honourable Mention.

BECKETT, GEORGE, 41 Fenchurch Street, Manufacturer (220, Class XVI.), for well-made boots and shoes.

BRIDARD, J., 53 Rue Vivienne, Paris (1115, France), for strong boots and shoes.

BREDIFF BROTHERS, 5 Rue Colbert, Tours, Manufacturer (73, France), for strong and very good shoes.

BREED, N. A., and Co., Lynn, Massachusetts (411, United States), for very good shoes for children.

CABU-FÉVRIER, Manufacturer (Belgium, 263), for boots for exportation, and their excellence relative to price.

CLARK, B., Whitehaven, Cumberland, Manufacturer (154, Class XVI.), for a lady's boot "clumped" with wood.

COWLING, J., Richmond, Yorkshire, Manufacturer (142, Class XVI.),* for easy shooting boots of excellent workmanship.

CREAK, JAMES, Wisbeach, Manufacturer (141, Class XVI.), for stout boots.
COULBOIS (1569, France), for varnished skins and boots made therefrom.
DOE, W., Colchester, Manufacturer (145, Class XVI.), for very strong and well-made navigators' boots.

DÖRR and REINHARDT, St. Worms (33, Grand Duchy of Hesse), for two pair of excellent boots.

FRIEDL, LEOPOLD, Vienna (332, Austria), for ladies' boots and shoes.

FROMONT-CLOLUS, 15 Rue Neuve, St. Meric, Paris (208, France), for boots and shoes, and well-made wooden shoes, adapted to persons obliged to work in the wet.

GARNER, D., 41 Finsbury Market (230, Class XVI., page 89), for "lasts."

GORDON, E., 6A Prince's Street, Leicester Square, London, Manufacturer (212, Class XVI.), for well-made screwed clamps solid boots, "pegged waist."

HELIA, JOHN, Vienna (331, Austria), for an assortment of ladies' boots and shoes, suitable for the class of wearers for whom they are intended.

HUBERT, C., 292 Regent Street, Manufacturer (194, Class XVI.), for ladies' and gentlemen's boots, and a lady's boot made from a single piece of leather.

JACOBS and DUPUIS, 32 Rue de la Paix, Paris (886, France), for ladies' boots and shoes suited to the higher classes of society, very well made.

LANGDER, J., Vienna (329, Austria), for good examples of boots and shoes.

LERKHE, Petersburg (311, Russia), for clogs and goloshes.

LONGDON, R., and SONS, Derby, and THOMAS SMITH, Bedford (119, Class XX.), conjointly, for the introduction of the elastic welt into boots and shoes.

MILLER, jun., Warsaw (234, Russia), for exceedingly light well-made boots, weighing only three ounces.

NORMAN, SAMUEL WILLIS, 4 Oakley Street, Lambeth (167), for excellence of work in ladies' cork-soled boots.

PEAL, NATHANIEL, 11 Duke Street, Grosvenor Square (197, Class XVI.), for two pairs of very good fishing or hunting boots of excellent workmanship.

RAPP, C. F., and SON, 22 Rue Feydeau (974, France), for tasteful-looking goods.

ROBERT, A., 123 Regent Street, London (224, Class XVI.), for excellence of workmanship.

SCHUMACHER, jun., Mayence (47, Grand Duchy of Hesse), for well-made gentlemen's boots and shoes "spring-fastened."

SCOTT, S. T., Union Street, Southwark (228, Class XVI.), for a "last" with an adjustment to elongate the model of the foot; a very useful and ingenious improvement.

SUSEB, H., Nantes, and La Morinière (Loire-Inférieure) (1022, France), for boots and shoes made for exportation. (Prize Medal awarded in Class XVI.)

TOLTSHKOFF, V., Government of Nijni Novogorod (314, Russia), for curiously-made felt shoes, produced by the peasants of the country.

VANDEROOST, M., Brussels, Belgium (427), for boots of excellent quality.

VIAULT-ESTÉ, J. J. J. B., 17 Rue de la Paix, Paris (725, France), for a very handsome case of ladies' shoes.

WILSHIN, S. B., 86 Albany Road, Camberwell (205, Class XVI.), for a method of fastening skates to boots.

GLOVES.

The article of gloves, on the manufacture of which so much skill and talent have been of late years brought to bear, employs a large amount of the population of the United Kingdom. We have to report many very valuable and highly important contributions, prepared with great skill, and exhibiting this branch of industry in every form in which it can be presented. France, particularly Paris, many cities included in the Zollverein, and some in Denmark and Switzerland, have also contributed specimens of gloves. It will be needful to remark in the first instance, upon the great talent of the French dyers of kid skins: in one case as many as 94 different colours are exhibited in the article of ladies' kid gloves; and various other descriptions are shown, particularly in lamb and sheepskin gloves, wherein great skill is exhibited; but it appeared to the Jury, that French gloves being so very largely imported into this country, some of the more important foreign manufacturers possibly considered that their articles were sufficiently well known, and did not think it worth while to send any contributions to the Exhibition. The ASSOCIATED GLOVERS at Prague have forwarded a highly-interesting contribution, which illustrates the state of this branch of industry in their city in a manner highly creditable to their skill. In conclusion, we may observe, that since the alteration of the tariff, and the importation of French kid skins, a rapid advance has been made by the English manufacturers, their skill and energies having been greatly called forth thereby.

The places at which gloves are chiefly made, are—London, Yeovil, Worcester, Woodstock, Torrington, Hexham, and Witney; and the value of the yearly produce is estimated at about a million sterling. Total of hands employed in England is about 46,000.

The Jury award Prize Medals to the following Exhibitors:—

BALL, W. Y., and Co., 32 Wood Street, Cheapside (80), for a variety of kid gloves, remarkably well made.

CHOSSON and Co., 63 Rue Montmartre, Paris (1150, France), for ladies' and gentlemen's kid gloves.

DENT, ALLCROFT, and Co., Worcester (78), for a very handsome and interesting collection of gloves, showing the various kinds produced in England; with very few exceptions, of the highest class and workmanship.

ENSOR, T., Milborne Port (185), for two-finger gauntlets, and various gloves, exhibiting very good taste.

FOSTER, PORTER, and Co., 47 Wood Street, Cheapside (2), for plush plumage gloves of good quality, forming a variety of novel and fashionable articles.

FOWNES BROTHERS, 41 Cheapside, London (82), for Irish kid, English dressed men's round seam gloves of good quality.

HOUBIGANT-CHARDIN, Rue du Faubourg St. Honoré (1627, France), for an assortment of gloves of excellent quality and colour, and very well sewed.

JOUVIN and DORON, 8 Boulevard Bonne, Nouvelle (1279, France), for a great variety of kid gloves of ninety-four different colours.

JOUVIN (Widow), Xavier (893, France), for many specimens of gloves of very good quality.

LAYDET and Co., 27 Rue de Grenelle, St. Honoré (296, France), for a case of gloves very well sewed.

LECOQ-PREVILLE, 50, 52, 53 Passage du Saumon, Paris (1303, France), for an assortment of habit kid gloves of good quality and taste.

PRAGUE, Glovers' Association of (336, Austria), for a very handsome contribution of gloves of various descriptions.

WHITBY, E., jun., Ycovil (186, Class XX.), for habit lamb-skin gloves, of a superior quality and very well made, the trade being prettily illustrated in the manipulation.

HATS.

In this branch of industry, examined by the Jury and Associates, important from the large number of persons employed in its various ramifications (scarcely less than 60,000), there have been numerous contributors; London, Manchester, and other parts of Lancashire, Cheshire, Germany, France, particularly Paris, the Netherlands, and the Zollverein, have, at considerable cost, forwarded illustrations of their manufacture. The specimens may be divided into four different classes, 1st. The old make of beaver hats, with nap; 2nd. The silk plush hat on foundations of cotton, linen, and other fabrics; 3rd. The felt hat (some specimens were shown in pure beaver fur), chiefly of hares' fur, or rabbits' fur; 4th. Hares' fur or rabbits' fur, mixed with lambs' wool, for lower or cheaper qualities. In all these descriptions of goods, the manufacture of each country is necessarily in conformity with the taste, style, and habits of the people; whence the various productions in this Class are highly suggestive and interesting. In the British contributions there are several very novel styles introduced, wherein the manufacturers have given considerable latitude to their fancy; but in an article of fashion, and of such constant use as hats, it does not appear to be easy to change the habits and tastes of the wearers, or to induce them to adopt a new costume. The specimens, where attention has been chiefly directed to excellence in quality and very high finish, are commendable, and form an interesting feature in this section of the Exhibition.

The manufacture of hats ranks as one of the oldest of the staple manufactures for which England is celebrated, and at an early period hats were articles of considerable export. They have been the subject of many legislative enactments; and it was not until the close of the last century that they were freed from Government interference, by the abolition of the stamp duty, which up to that time was chargeable upon them.

CHRISTY and Co., of 35 Gracechurch Street, London, and of Stockport, near Manchester, have contributed a most complete and interesting illustration of the manufacture of hats, both in beaver and silk, consisting of materials in the raw state, prepared for use, and in the different stages of manufacture up to the finished state, as made for the home, colonial, and foreign markets, together with the tools used in the manufacture.

Although this exposition completely fulfils the object proposed in the Exhibition, and the manufactured specimens are of the highest class, the Jury are unable to award the prize to this house, from the circumstance of its being one from which a Juror has been selected.

The Jury award Prizes to the following Exhibitors :—

BERNI and MELIARD, 56 and 57 Great Guildford Street, Southwark (103), for a case of hats of various styles, well manufactured.

CHENARD BROTHERS, Paris (87, France), for a beaver hat, and two hares' fur hats, made upon the old Flemish principle, and very well done.

COUPIN, J., Aix, Rhone, Rue de l'Aigle d'Or (1162, France), for some felted hats "in the rough," very well felted, and good in quality.

SIMMONDS and WOODROW, Oldham (105), for a selection of felt bonnets of good quality, and handsomely got up, in pure beaver and other furs.

The Jury have made Honourable Mention of the following Exhibitors :—

BATON, W., and SONS, Rue St. Avoie, Paris (1069, France), for hats made of hares' fur, on the Flemish principle, and exemplifications of the various stages of manufacture.

BRAUND, J., 26 Mount Street, Grosvenor Square (66), for a cap with transparent talc peak, useful for travellers.

LYONS, J., 12 and 13 Artillery Place, Woolwich (67), for military caps, which will resume their shape after having been folded in a knapsack.

MELTON, H., 194 Regent Street, Manufacturer (54), for a lady's elegant lavender-coloured riding hat.

PEARSON, J., Stockport (126A), for a child's bonnet and feathers.

ARTICLES FOR GENERAL OR PERSONAL USE.

The almost infinite variety of articles in this class, although possessing great merit and excellence, do not, except where specially noticed and recommended by the Jury, exceed what may be obtained in the ordinary way of trade, and although many of these contributions are valuable, and exhibit great skill and talent, serving to complete this department of the Exhibition, it has not been deemed necessary to do more than mention them in general terms.

Upper Clothing.

Considering the vast extent and variety of this branch of industry in every part of Europe, it is almost impossible to give a summary which will do justice to the talent and ingenuity displayed by many individual contributors. In the fashionable articles of dress presented, not only from the metropolis, but from many of the largest towns of the United Kingdom, great skill is exhibited; and when are added to these, the leather coats richly embroidered and lined with skins and furs from the northern parts of Europe, the richly-embroidered dresses of Hungary, Russia, Tartary, Turkey, Egypt, China, and India, of exquisite workmanship, and in many cases made up with the greatest ingenuity to repel the cold, it is imperative on the Jury to call attention to the high merit due to the contributors of this vast assemblage of merchandize, and to bear testi-

mony to their great and persevering industry. The cursory observer passing from section to section, may indeed admire the various productions of art; but those alone whose duty it has been to visit every individual contribution, and examine it in detail, can justly appreciate the vastness of the effort by which it has been made.

The importations of wool for home consumption in the manufacture of cloth, exclusive of that of our home growth, was, in the year 1849, 279,472 bales, or about 56 millions of pounds. It is not possible to estimate the number of yards of cloth into which the said wool is wrought, or the various articles made therefrom; but it is evident that the working up of cloth into clothing "*for immediate personal or domestic use*," must necessarily employ a large mass of the population. In London, alone, it is estimated that there are 30,000 persons employed in making up clothes for men. It must be remarked and regretted, that the Exhibition has received no contributions adequately representing either the British or foreign superior "tailoring department," or the article produced by the ready-made and slop-selling departments, employing so many thousands of hands, in which also a large capital is embarked, and from which sources, whether it regards Great Britain or foreign countries, the army, navy, and other Government institutions, public bodies, the commercial marine, and, to a great extent, the colonies, derive their supply of clothing.

The Jury award the Prize Medal to the following Exhibitors:—

BUCKMASTER, W., and Co., 3 New Burlington Street (1), for a very handsome blue frock coat, and various articles of Court costume; exhibiting great taste and improvement in this kind of dress.

KRACH BROTHERS, Prague (391, Austria), for double pilot-cloth, to form a coat either side outwards of a different colour, and coats of excellent workmanship.

MALATINZKY, E., Hungary (394, Austria), for richly-embroidered over-coats.

MCGEE, JNO. G., and Co., Belfast, Manufacturers (118), for several extremely elegant waistcoat pieces, the patterns for which were produced in the School of Design, Belfast.

OPIGEZ and CHAZELLE (336, France), for very excellent embroidered silk, wrought up into dresses of elegant style.

SINGER, J., Pesth, Hungary (392, Austria), for several very good dress coats.

WELCH, MARGETSON, and Co., 17 Cheapside (212), for a very elegant contribution of braces, carriage rugs, ties, cravats, handkerchiefs, shirts, robes, &c.

The Jury make Honourable Mention of the following Exhibitors:—

BALLY and Co., Schoenenwerd (210, Switzerland), for a display of braces, of merit and moderate price.

BRIQUET and PERRIER, 22 Rue Jean Robert, Paris (1116, France), for a case of elegantly-wrought braces.

FARRANGE, Miss, Bray, County Wicklow (176), for some very beautifully-knitted stockings.

HARDING, T., 108 Regent Street (211), for real agate buttons, good, both in style and taste.

HARRIS and TOMKINS, Abingdon, Berks (111), for two smock frocks, exceedingly well made by two cottagers.

HOLMES, J., and Co., 171 Regent Street (84), for a very elegant shawl cloak, of new design.

HUET, Widow, Rouen (270, France), for a great variety of elastic, very well made.

KEARSE, T., Limerick (175), for a novel plan of inserting India-rubber in articles of dress.

RABOURDIN, 88 Rue du Marais, St. Martin, Paris (1416, France), for elegantly-made hraces, at very moderate prices.

SAYCE, J., and Co., 57 Cornhill (307, Class XII. and XV.), for a very light coat called "Piuma Coat."

SOLOMON, Mrs. S., 52 York Road, Lambeth (86), for an embroidered ball dress.

STEWART, JANE, Templetrine Glebe, Bunder, Ireland (177A), for some very elegant knitting.

VINCENT, RICHARD, Glastonbury (177), for a suit of clothes made of black dyed and prepared sheep skins; a new application of this material.

WALKER and BABR, 306 Strand (63), for an alpaca coat sufficiently light and portable to be carried in the pocket.

Shirts.

On carefully examining the shirts, our opinion is, that in the finer quality into which embroidery enters largely, the French are superior; there is but a small exhibition from wholesale houses, and scarcely any of a low quality; the collection, therefore, embraces only the higher class of goods. This branch of our industry is an article of fashion, and the number of persons employed is much on the increase. In the better classes of work, the hands obtain for their labour prices which afford them a fair livelihood, their earnings amounting from 9s. to 12s. per week: the shirts for which wages of 2s. each shirt are paid, enable the quick workwoman to earn about 2s. per day; but it must be observed, that by the division of labour, an increased amount of wages is earned relatively, and the work is thereby considerably enhanced in quality and skill. These observations apply solely to the higher class of shirt-making.

The Jury award Prize Medals to the following exhibitors:—

DOUCET and DUCLERC, A., 21 Rue de la Paix, Paris (147, France), for shirts, embroidered with crests and names, of good shape and make; and for various other articles.

HAIGHT, Mrs. W., New York (385, United States), for a plain shirt, of good shape, and very good work; a light material, suited to hot climates.

MOREAU and Co., 22 Rue d'Enghien, Paris (652, France), for some exquisitely-embroidered shirts of good shape, suitable for French wear.

The Jury make Honourable Mention of the following exhibitors in this division:—

BRIE and Co., 189 Regent Street, London (24), for attached shirt collar

to a waistcoat; the waistcoat of excellent shape. (Prize Medal awarded in Class XIX.)

DARNET, Rue Richelieu, Paris (1578, France), for very elegantly-embroidered shirts. (Prize Medal awarded in Class XIX.)

HAYEM, —, sen., 38 Rue du Sentier, Paris (1265, France), for exceedingly beautiful cravats.

SCOTT, P., Edinburgh (141, Class XX.), for fine-breasted shirts, and several collar-shirts.

SMITH, J. E., 3 Lawrence Lane, London (29), for a shirt without seams or gathers; and Moravian needlework.

SOCIETY OF NEEDLEWOMEN (147), for a collection of shirts of good shape, and very firmly worked. Exhibited by a benevolent lady.

VALTAT and ROUILLE, 70 Rue de Rambeteau, Paris (709, France), for a quantity of good shirts, well made, and very cheap.

WHEELER and ABLETT, 23A Regent Street (22), for a shirt, elaborately embroidered, and very well made.

Corsets.

On reviewing the articles of corsets, as produced by the exhibitors, the Jurors and Assistant Jurors conversant with the trade, after carefully examining every case, find but few specimens in which there is novelty combined with useful improvement: there are several combinations of anatomical bandages, or supports, with the corset, as an article of dress; with these exceptions, it does not appear that any very great advance has been made in the higher class of corsets beyond the attention which is unceasingly given to an article of such universal and fashionable use. In the instances before alluded to, the improvements have been pointed out. In the general trade, within the last four or five years, the make and shape of these articles have been greatly improved, so that there can now be obtained by all classes, a well-formed and good corset at a very moderate price: a large quantity are now woven by machinery.

The Jury award the Prize Medals to the following Exhibitors:—

JOLY, Madames, SISTERS, 45 Rue Neuve, St. Augustin, Paris (892, France), for a corset of very novel description; elegant and useful.

JOSSELIN, J. J. (551, France), for corsets.

ROBERT WERLEY, and Co., Bar de Duc, Meuse (1444, France), for corsets of excellent manufacture and unexceptionable shape.

VAN BENEDEN-BRUIERS, Brussels (345, Belgium), for stays of good description without seams, and of excellent workmanship.

The Jury make Honourable Mention of the following Exhibitors in this department:—

BERGER, Madame, Brussels (349, Belgium), for a variety of excellent stays.

PIPER, T. F., 4 Bishopsgate Street Without (41), for the hygienic child's corset; of novelty and great advantage.

SMITH, Mrs. CHARLOTTE, Bedford (119), for a corset of construction.

SOULS, HYPOLITE, Madame, Paris (1492, France), for corsets of good make.

Straw Plait and Bonnets.

Though the manufacture of straw-plait and bonnets in England may be considered of recent date, its origin being about one hundred years ago, it has now arrived at a state of great perfection in all its varied branches: this may in a measure be accounted for by the circumstance of the whole female population wearing bonnets; which, with the exception of North America, are but partially used in other countries. At the present moment, it is calculated that from 60,000 to 70,000 persons are engaged in the production of this article; and it is considered that the yearly return cannot be less than from 800,000*l.* to 900,000*l.* With regard to straw goods of foreign manufacture, we have to mention, as most prominent, those of Tuscany and Switzerland. The Leghorn hats, formerly in so much demand, are now but very partially worn, and the same remark may also be applied to the Tuscan plait, which, at the present time, is not adopted in fashionable wear. The Swiss fancy straw-plaits and trimmings occupy a prominent place in this branch of industry, are of great importance to the localities where they are produced, and great taste is displayed in their design and execution, so as fully to meet the constant demands of fashion. Germany and Lombardy have also a limited share in the straw manufacture, of whose production a few specimens are exhibited. We regret to be unable, from sufficient data, to state the extent of the amount of the annual returns, or of the employment furnished by the foreign branches of this trade.

The Jury award Prize Medals to the following Exhibitors in this department:—

ABT BROTHERS, and other exhibitors (227, Switzerland), for straw plait.

ALLEN, JAMES, and Co., 158 Cheapside (13), for ladies' and children's straw hats and bonnets, principally of British materials, some of which are very good.

GREGORY, CUBITT, and Co., 15 Aldermanbury (8), for an assortment of hats and bonnets, with specimens of various kinds of straw and plaits, forming an interesting exhibition of this branch of industry.

LONG, GEORGE, of Loudwater, Bucks (16), for hats and bonnets made on the pillow-lace principle.

MUIRS, CONNELL, and BRODIE, Luton, Bedfordshire (173 and 215), for bonnets made from rye-straw, grown in the Orkney Islands, in imitation of the Tuscan plait.

NANNUCCI, Florence (67, Tuscany), for a case of very fine Leghorn hats and capotes of good workmanship.

SULZBERGER and AKERMANN, Meisterschwanden, Switzerland (234), for a variety of Swiss straw plaits and trimmings of good kind, exhibited in six glass cases.

VYSE and SONS, 76 Wood Street (11), for a case of bonnets of various sorts, in good taste and well manufactured.

VYSE and SONS, Prato, Florence (66, Tuscany), for a selection of very fine Leghorn hats and capotes.

WELCH and SONS, 44 Gutter Lane, London (12), for a case of hats and bonnets, made of foreign and English materials, of good style and manufacture.

WOHLER and Co., Canton of Argovie (227, Switzerland), for a large assortment

of Swiss straw-plait and trimmings, of all descriptions; together with articles showing great skill in this branch of industry.

The Jury make Honourable Mention of the following exhibitors in this department :—

CLARAZ, A., Fribourg, Switzerland (228), for a variety of straw-plaits, hats, and bonnets, illustrating the peculiar description of industry of this canton. (Prize Medal awarded in Class XXVIII.)

DEPIERRE BROTHERS, Heiden, Canton of Appenzell (189, Switzerland), for embroidered straw bonnets, got up with great taste.

MILWARD, JAMES, and SONS, New York (93, United States), for bonnets made of cotton-braid; commendable for being a new application of this material.

Various articles of foreign manufacture, not easily classed with the European goods, have been considered by the Jury in reference to the producing countries.

TUNIS.

Magnificent dresses for Turkish ladies (page 314), of rich silks finely embroidered in gold and silver; dresses for gentlemen, and also richly-embroidered woollen dresses woven in one piece. The strength of thread fabrics, and the excellence of the weaving, entitle them to notice as highly-interesting specimens of woollen manufacture.

The Jury make Honourable Mention of the following articles exhibited in this department :—

(No. 41, Tunis), silk wrought as a separate article, of great substance and beauty, highly remarkable; and the woollen Bernous for common wear, and that for the higher classes, are both very excellent.

(No. 48, Tunis), for dresses of the country, in cotton and silk; also dresses in woollen and mixed materials, exhibiting great strength and excellency in the weaving.

(No. 10, Tunis), for various articles of dress, fez caps, and many shawls made of worsted, and other materials, very strong and durable, and colours remarkably good.

(No. 12, Tunis), for a variety of slippers adapted for use in the country, and some richly-embroidered boots.

TURKEY.

The admirable examples of costumes, collected by order of the Turkish Government, and exhibited by His Highness the Sultan, were found worthy of the highest commendation by the Jury; but unfortunately, from the system adopted in the collection of these examples by traders, from the dwellings of the poor in the more useful domestic articles, and the harems of the wealthy in those of fancy embroidery, such as slippers, veils, &c., it is impossible to recognise, either by Medal or Honourable Mention, many of those to whom such distinctions are justly due, as no names are given whereby the Jury can take cognizance of the

articles. Those cases which the Jury have been enabled to recognise are selected as much from the facility for giving such recognition as for the high merit displayed in the production, inasmuch as there are others deserving of the same consideration, could the Jury have discriminated amid the vast collection of articles.

The embroidery and fashion of the costumes are of the highest class, and extremely costly. These dresses, although the costume of the country, are very suggestive; the style of the embroidery, of the highest order; an art which appears peculiar to the country; the slippers also are very elaborately wrought; the veils are richly ornamented with gold and pearls, several of them valued at 25*l.* each.

The various articles of ladies' attire in silk are very richly embroidered; crasse dresses, embroidered scarfs, of the most exquisite description, not only as regards the material, but also the design and the combination of colours with the arrangements and disposition of the various materials employed; rendering many of these specimens of the utmost value to our manufacturers.

Many articles of dress from Damascus are not only for the higher, but for the industrious classes; and when it is remembered that many of these are the domestic production of the people, and made in their own cottages, too much praise cannot be bestowed on the skill, elegance, great usefulness, and durability of the goods exhibited.

The hosiery is of various kinds, the household produce of the Angora women. Some of the socks are as high as 10*s.* per pair, while the commoner ones for the working-people are produced at exceedingly low prices.

Prize Medals have been awarded to—

His Highness the SULTAN OF TURKEY, for the collection.

FERUVELADGI, The (Tailors' Association of) of Janina (408 to 413 in the Turkish Catalogue), for Albanian costumes, male and female, of rich effect and excellent workmanship.

SOFIALIOGLOU'S DAUGHTER, Constantinople (874, 875, 876, in the Turkish Catalogue), for veils, embroidered in gold and pearls, with silver fringes.

The Jury make Honourable Mention of the following persons, whose works are exhibited in the Turkish Department.

BUKUDGY (THE GIRL), Constantinople (988, 989, Turkish Catalogue), for embroidered slippers, called ship-ship and filar.

CARABET'S WIFE, Constantinople (991, 995, Turkish Catalogue), for embroidered slippers.

ISTCHE (THE GIRL), Constantinople (98, Turkish Catalogue), for embroidered slippers, called filar.

TERZY'S WIFE, Constantinople (986, 994, 996, Turkish Catalogue), for embroidered slippers, called ship-ship.

GREECE.

Greek dresses are exhibited in blue and silver; also red and gold dresses from different islands, of very good work, and elegant patterns.

INDIA.

The Jury desire to recognise the articles exhibited in this division. These consist of cloth of real cashmere wool, extremely light, thin, and fine; various dresses exhibiting the Indian costume, in gold tissue and embroidered. There are also articles of dress from Cashmere, richly embroidered in needlework, and muslin, the produce of the country. The silks are stated to wash perfectly well. Acknowledgment is due to the HONOURABLE EAST INDIA COMPANY for this contribution.

CANADA.

The Jury desire to make Honourable Mention of—

ADAMS, W. H. F., Montreal (331, Canada), for cloth made in Canada; his own production.

BARBEAU, J., Quebec (Canada), for boots made of deer skins, very excellent in quality, cheap, and waterproof.

CHINA.

Honourable Mention is due to the exhibitor of the magnificent dresses for the higher classes of Chinese, in silk, very richly embroidered.

The Jury desire to record their opinion, that if Council Medals are awarded in similar cases, then they are eminently due to His HIGHNESS THE SULTAN OF TURKEY, and His HIGHNESS THE BEY OF TUNIS, for the valuable contributions which they have made to the Exhibition.

T. CHRISTY, *Reporter*.

London, July 1851.

CLASS XXI.

REPORT ON CUTLERY AND EDGE-TOOLS.

Jury.

Right Hon. Lord WHARNCLIFFE, *Chairman and Reporter*, 28 Lower Brook Street.

JOSEPH B. DURHAM, *Deputy Chairman*, 456 Oxford Street; *Cutler*.

C. KARMARCKH,* *Zollverein*; *Director of the Polytechnic Institution*.

NUBAR BEY, *Egypt*.

ALDERMAN CHARLES PEACE, *Sheffield*; *late Cutlery and Edge Tool Manufacturer*.

J. LE PLAT, *France*; *Engineer-in-Chief of Mining School, and Professor of Metallurgy, Paris*.

* Dr. SCHAFFHAUTL; *Professor of Metallurgy. (Proxy for M. Karmarsch.)*

Associates.

THOMAS DE LA RUE, 110 Bunhill Row; *Ornamental Stationery Manufacturer. (Juror in Class XVII.)*

THOMAS HETHINGTON HENRY, F.R.S., 18 Lincoln's Inn; *Analytical Chemist*.

JAMES RAGG, *Sheffield*; *Scissor Manufacturer*.

C. VENABLES, Plomer Hill House, High Wycomb; *Paper Manufacturer. (Juror in Class XVII.)*

THE Jury for Class XXI. think it desirable to preface their Report by some remarks on the extent and general characteristics of the Class submitted to their judgment, and to offer such general comment and analysis as may serve in some degree to present a connected view of the information therein conveyed, with respect to the progress and position of this species of industry among the countries whose contributions compose it.

There is one point upon which an explanation should be given at the outset. Two important sections of those articles which would ordinarily be comprehended under the designation of "Cutlery," are not here included—those of *surgical instruments*, and of *weapons of war*. The objects therefore referred to this Jury consist of such as are designed either for common and domestic use, or for various manufacturing operations.

It appears, according to the information laid before the Jury, that there are altogether about 368 exhibitors in this Class, distributed, very unequally, among twenty-two of the geographical divisions contained in the Official Catalogue. The United Kingdom, as was to be expected, has furnished a proportion amounting to not less than 45 per cent. of the whole list; and among these are to be found many contributors, on so extensive and varied a scale, that its share in the total display of these articles is much larger than the above numbers would imply. The second place is occupied by Austria, whose exhibitors constitute 27 per cent. of the entire sum. After her, the Zollverein States of Germany, furnishing about 8 per cent.—France about 3 per cent.—Sweden and Norway in nearly the same proportion. A very small number of exhibitors from the remaining

countries complete the list, though some of these national collections, however confined to few individuals, contain objects well worthy of attention.

These results must not be taken as any certain indication of the comparative proficiency of the respective countries in the production of commodities of this kind, or of the value of their contributions. It is probable that in some degree they may show the character and nature of the manufacture as carried on in these different states, and correspond with its subdivision among more or less numerous hands in comparison with its total extent. In Austria, for instance, we find by the Catalogue that the collections specified as assignable to each exhibitor consist for the most part of one kind of manufactured article, scarcely any of more than two or three; and we may, therefore, perhaps venture to infer that the high number of these, as compared with some departments where they are individually more comprehensive, arises from a very different distribution of capital among their separate establishments in this branch of industry.

But this is not to be considered as a disparagement to their contributions. Such a condition of the manufacture may be best adapted to the supply of the particular demand for which it exists; and as regards the present occasion, even apart from such considerations, the appearance of a numerous list of exhibitors from any one country may be reasonably taken as a gratifying evidence of the interest and activity awakened there by the invitation to co-operate in a display of the works of universal industry, and of an active desire to share in its honours.

The characteristics of the different national collections are, however, interesting in more than one point of view. We may detect in various instances indications of the peculiar condition and habits of the people whence they come, of their social and industrial wants and aims, as well as of their natural or acquired advantages.

In England the close proximity of coal and iron, together with abundant facilities for converting the latter into steel, gave, at an early epoch, to this branch of its manufactures remarkable energy and importance. Its steel wares had a wide-spread reputation even in the middle ages. The authority of Chaucer assures us that in the fourteenth century the "Sheffield whittle" was an article of choice estimation; and within their respective spheres, the blades of Toledo and Damascus were scarcely more valued than the more homely cutlery of England. This pre-eminence the Jury can have no hesitation in pronouncing that she still retains to a very remarkable degree in the present Exhibition; though the general statement must now admit of modification, and it would be untrue and unfair to make it without adding, that she has in certain branches of the manufacture some formidable rivals. Still, the long-established trade of this country in steel goods of every description, and her ancient practice of forging them for the supply of all markets, are shown in the great variety as well as excellence of her contributions, which comprise specimens of almost every conceivable article of this description. But in other countries, where the manufacture has been of more recent growth, it is evident that the energies of their artizans have been directed, by a natural consequence, to the production of those particular articles more especially called for by their individual position or exigencies. One of the chief objects of the German Customs Union, for instance, has been to encourage the supply from their own workshops of those commodities of general and ordinary use, which were formerly in great part derived from importation. From the Zollverein States,

accordingly, we find a mixed collection of that character, consisting mainly of common cutlery and simple tools, together with some few objects of the plainer kind for certain foreign markets. From Austria, where the mines and manufactures are in the immediate neighbourhood of a large agricultural and pastoral population, it is to be observed that the collection consists largely of scythes, sickles, and the simpler instruments of husbandry. In Switzerland, the traditional manufacture of fine watch-work renders delicate files a matter of primary necessity, and there is, therefore, a predominance of these among the better articles in this department. The Belgian collection is distinguished by "spiral cutters" of superior quality, required in the finishing of the woollen fabrics for which that country has long been famous. In France, we of course find a very miscellaneous collection, but it displays in a marked manner productions indicating, on the one hand, the highest scale of social civilization and of manufacturing skill in certain spheres and localities, and, on the other, the simplest wants of a primitive provincial population; while in the United States and Canada, where the occupation of the population is an incessant war upon the forest, the manufacture of axes and woodmen's implements assumes an importance which has raised them to the highest perfection, and renders this class the most perfect part of the transatlantic exhibition. But it appears advisable to add some more precise notices of the peculiar contents of each national collection; and for this purpose it will be most convenient to take the two great divisions in the order adopted in the Official Catalogue.

First, then, with respect to the United Kingdom, we find that articles in the Class of Cutlery and Edge-tools have been sent from a great variety of places. In England, from London, Sheffield, Birmingham, Warrington, Stourbridge, and a few other towns of less note; from Glasgow and Edinburgh, but chiefly from the former, in Scotland; and from Cork, Clonmel, and Limerick, in Ireland. Among these seats of the manufacture there is none, as might naturally be expected, which for extent, variety, and excellence of collection can compare with Sheffield,—its most ancient home. We here find every article, from the most exquisite razor down to the plainest pocket-knife, and from the finest saw or file to the most ordinary chisel, displayed, with various degrees of merit it is true, but with a large proportion of the highest. From this collection the Jury have thought themselves justified in awarding for one remarkable object a Council Medal. Messrs SPEAR and JACKSON have exhibited, among an assortment of edge-tools of great excellence, a cast-steel circular saw, of the large size of 5 feet diameter, and of such signal beauty and perfection that it stands far above comparison with any other in the Building. The mere excellence of its quality and workmanship, however, would not, the Jury are aware, have enabled them to distinguish it by a Council Medal, if they had not been able to satisfy themselves that its merit is the result of a new and peculiar process of manufacture. But they entertain no doubt, from the information they have received, that mechanical ingenuity of a novel and special character has been employed by these manufacturers for the production of such articles, without which they could not be carried to equal perfection: and they therefore consider them justly entitled to the highest mark of distinction.

There are two other contributions to which the Jury would have felt them-

selves called upon to award a similar honour, if they had been at liberty to regard singular excellence of workmanship and quality as of itself a sufficient title. Messrs. TURTON and SONS, of Sheffield, and Messrs. STUBBS, of Warrington, each display a complete assortment of files of various sizes,—the former, for ordinary manufacturing purposes, the latter for the finer operations of the watchmaker,—which, the one for large dimensions, and the other for minute delicacy, combined with the utmost strength and efficiency of material, far surpass any other objects of the same class. They would have deserved the highest assignable reward in respect of these points of merit. Prize Medals, however, have been awarded to them, in common with a number of associates not unworthy of their company. It will be found that the list of these contains a series of names of which many are of high note in the estimation of the public, and whose contributions—some extensive, and comprising in a high degree almost every variety of excellence, others limited, but of marked merit throughout—display the choicest productions in the most finished cutlery, and the finest mechanical tools.

The attention of the Jury was particularly called to one novelty exhibited by Messrs. BLAKE and PARKIN, of Sheffield, consisting of the union of two qualities of cast steel, hard and soft, in the same article: having carefully examined these specimens, which were manufactured with much skill, they have no reason to doubt that the process is peculiar to the Exhibitors; but they cannot satisfy themselves that it involves any clear advantage over the combinations of cast and bar steel, and of cast steel and iron, the methods of cementing which have been long known and practised.

The contribution from London is of course on a more limited scale than that from Sheffield; but it consists of that superior order of cutlery for which the Metropolis has a long-established reputation, and contains articles of high merit in this Class. Among the Exhibitors from London, Mr. DURHAM, of Oxford Street, would have been considered by his colleagues deserving of a Prize Medal, if his consent to act as Juror had not disqualified him from accepting it.

The finer descriptions of cutlery are nearly confined, in England, to the Sheffield and London departments; but there are a few articles contributed by individual manufacturers from other places, whose names will be found in the Award List; and there are some also furnished from Ireland and Scotland, which, though not equal to the best from the chief seats of the manufacture, are still of considerable excellence.

Manufacturing tools are supplied largely from Birmingham, and sparingly from Scotland: scythes and files from Stourbridge and Warrington; which latter place furnishes the beautiful collection of watch-files, by Messrs. Stubbs, already mentioned.

On the whole it appears that the British manufacture of cutlery remains still, as heretofore, mainly seated at Sheffield, though it has been established also to a limited extent in some other quarters. The same gradual change of circumstances which has operated to transfer, in a great degree, the silk and some other trades from London to the provinces, has had the effect of withdrawing much of this branch of industry from the capital; though a portion, chiefly directed to the production of the higher order of articles, still retains its footing there, and sustains its reputation. On the other hand, the manufacture of the coarser goods,

such as tools and mechanical implements, is now extensively shared by several localities which afford the requisite facilities for its successful prosecution, and where the various other forms of industry which surround it create a continued demand for its productions.

Extending our survey beyond the limits of the United Kingdom, from its provinces to its dependencies, it will be found that these present aspects so very different, that certain distinctions are indispensable, with reference to a proper estimate of their position as exhibitors.

It is not to be expected that in infant communities, such as most of the Colonies, properly so called, a manufacture of this kind could have attained any considerable growth or perfection; though the greater progress and development of some few have enabled them to meet their peculiar local exigencies with considerable success. We find in this category a small contribution from the Cape of Good Hope, by the Missionary Station at Gnathendahl, consisting of various forms of knives adapted to the uses of that country; and from Nova Scotia another, of cutlery made of Nova Scotia steel, though manufactured in Sheffield: both are creditable to these colonies. While from Canada (West) there is a larger assortment, consisting entirely of axes and tools, the former especially of excellent quality, and proving the skill and power of her artisans to supply those particular articles to which her physical exigencies give the highest importance.

On the other hand, there are contributions from dependencies which are to be considered in a very different light, not newly-peopled, but ancient communities, variously advanced in civilization, and having their own established and characteristic industrial pursuits, often of the highest order of manual dexterity. In this division there are some from the vast territories of the East India Company, which well deserve notice; and a small contribution from Jersey. The Indian Department contains various Hindoo and Malay tools for the use of carpenters and workers in metals; and among them are found, from Moorsheda-bad, in Bengal, a set of the implements employed by the native artificers in carving the beautiful ivory articles which have so long been admired in the western world, and which present such rare examples of ingenuity, taste, and skill.

Articles of this kind, however, are of so peculiar a nature, and of so limited an application, that they can scarcely be considered as bringing into play any principle of general competition or comparison. It is not so with the foreign neighbours of Great Britain, whose productions come next under notice. They will be found to extend, with various degrees of excellence, through all the class of commodities which proceed from the workshops of the United Kingdom, and to include some, also, of a peculiar and distinctive character.

Looking first to Europe, its foreign exhibitors may be classed under certain great subdivisions, which are naturally suggested by the position and relations of its different members, and may conduce to the clearness and convenience of the survey. Thus the several national departments, contained in the total list, may be advantageously connected as follows:—

1. France, Belgium, and Switzerland ;
2. Austria, and the Southern States of Germany ;
3. The Zollverein, and Northern States ;
4. Denmark, Sweden, and Norway ;
5. Russia ;
6. Spain and Portugal ;
and finally,
7. Turkey, Egypt, and Tunis ;
8. China ; and
9. The United States of America, will complete the distribution over the remainder of the world.

1. From France there is an extensive assortment, ranging from the finest ornamental cutlery down to the rudest and cheapest articles for domestic use, which in general character is very good, and in some instances of superior quality. The greater portion appears to be supplied from Paris ; but there are a few exhibitors also from the provinces—from Moulins (an ancient seat of this manufacture), from St. Etienne, and from places in the districts bordering on the Rhine.

In cutlery, the best specimens are those of razors, penknives, scissors, and table-knives, many of which are very highly finished and elaborately ornamented, and display great skill as well as superior quality. Among the tools and implements are to be found a very excellent circular saw, showing high proficiency in this branch of the manufacture, and assortments of files, also of considerable merit as to workmanship, though found, after a careful trial, to be not quite perfect as to the quality of the steel. On the other hand, they mention particularly the samples of "web-saws," which are of the very highest class, and, indeed, superior to anything of the same description contained in the English collection.

Belgium supplies cutlery, together with files, scythes, "ledger blades," and "spiral cutters." These last articles are portions of the machinery used in the dressing of cloth, and are of a high degree of merit. The cutlery, principally of the table kind, is well finished, but the metal is somewhat soft, and unequal to the workmanship. The same must be said of the scythes and files.

From Switzerland, the articles consist mainly of razors, and of small files adapted to the use of the watchmaker. The former are of fair quality ; the latter of the most delicate workmanship, and well suited to the trade for which they are designed, and which has been long successfully pursued in that country.

The attention of the Jury was called, in the French Department, to a collection of articles, as examples of remarkable cheapness, which they would not have deemed worthy of mention on any other grounds. These are a certain description of extremely rude pocket-knife, said to be in very universal use among the peasantry of France, for cutting their provisions, and other purposes. They are formed of a rough blade of soft iron, folding into an equally rough turned cylindrical handle of wood. It is obvious that, with such materials, their utility must be very limited ; but they are sold for *five centimes*, or about *one half-penny*, each, and are therefore in general use among the poorer classes.

In France, Belgium, and Switzerland, the manufacture of cutlery and edge-tools has greatly improved, and seems likely to continue to do so.

2. Of the subdivision of States which we have placed next in order, the same improvement may, to a considerable extent, be observed. If we include therein Austria, Wurtemberg, and Saxony, we find that the two latter, at least, exhibit specimens of general knife cutlery, and of hunting-knives, which, though they cannot be pronounced equal to the best English, are of very good quality, well finished (especially in the Saxon portion), and mounted with much costly ornament. From Austria the display is not of so high a class; the cutlery from that country is of a very ordinary description, chiefly the produce of Styria, and is stated to be exhibited, in a great measure, as an example of cheapness. After such consideration, however, as the Jury have had the means of giving to this point, they conclude that the price is not below what goods of the same quality might be produced for in other countries. The articles are very deficient in merit of any other kind, many of them not even being of steel.

These remarks apply in a great measure to the tools and implements in this department. There are some from Wurtemberg of fair quality, but the assortments of files and other such objects from Austria, are indifferent, and not, apparently very low in price. There is here, however, one description of article deserving of notice, as a curious example of the modification which all tests of merit must undergo when judged by the peculiar uses for which the production is designed. There are from the southern provinces of Austria assortments of scythes, worked thin, and with a concave surface, very difficult to forge, and therefore requiring much skill in the workmanship, but of metal so soft and inferior, that they would not have been considered worthy of any notice were it not that they are so made purposely to suit the particular habits of an agricultural population, who mow all crops, whether of grain or others, close to the surface of a soil generally abounding in stones. A scythe of hard steel, with a fine edge, though it might perform its work better where unimpeded, would be liable to constant injury, very difficult of repair, under such circumstances; whereas, these Tyrolese or Styrian scythes yield at once to the blows which they receive upon their edge. The labourer carries with him a small hammer; and whenever the blade has so far lost its shape as to need renewal, he beats it out in a few moments to its original form; hence the softness of the metal, in most cases considered wholly inconsistent with excellence in this branch of manufacture, becomes an essential property.

3. From the States of the Zollverein, and from Hamburg and Mecklenburg-Schwerin, in Northern Germany, there is a collection of articles of almost every description. The two latter States contribute only on a limited scale; Mecklenburg some razors, and Hamburg also, together with a small collection of tools, of fair quality. The former commodities are not good of their kind, and those from Mecklenburg apparently very high in price. Of the cutlery from the Zollverein, much, though highly finished, is of an ordinary description, consisting of table and pocket-knives in considerable variety; but there are also certain "spear knives," designed for fishing by the natives in the South American rivers, and adapted for their markets, which deserve notice as of superior manufacture. Among the tools the same character prevails as in the cutlery, though there are certain "web-saws" which evince higher skill. There is an assortment of scissors, chiefly from Solingen in West Prussia, worthy of attention as being manufactured

in great numbers from an ore producing a "natural steel," which is of such quality as to suffice for the purpose to which it is here applied, and to save the manufacturer the cost and labour of the converting process, thereby enabling him to produce such goods at a price much lower than would be profitable with the ordinary methods. The workmanship of these scissors appear to be fair; but the Jury were unable, after much attention to the point, assisted by the judgment of Mr. Ragg, an experienced workman, to satisfy themselves entirely as to the real quality of the metal, although the material from which they are said to be manufactured has been examined by Mr. Henry, and was pronounced by him to be steel.

4. The collections from Denmark, Sweden, and Norway are small, and contain little that requires notice. From the two latter countries the number of exhibitors bears a large proportion to the extent of the contributions, indicating establishments on a very limited scale; and although Sweden has long produced the most valuable iron, as the raw material of the finest steel and of the most finished cutlery, it does not appear that the manufacture itself has made any great advance. The collection consists of some razors, spring-knives, and other cutlery tools of an ordinary kind. From Denmark there is one singular article, a set of files, hollowed, and made to fit within each other: they are curious, and difficult of manufacture, but of no apparent utility.

5. Of the three contributions from Russia, one only is from a private individual, the other two are from imperial establishments. The former contributes a varied assortment of cutlery of all kinds, and of fair quality; the latter some tools, which cannot be ranged very high, and some scythes of the same kind as those whose peculiarities were described in the Austrian Department. The Russian implements of this description are the best.

6. From Spain and Portugal the contributions are very small. The former exhibits only an assortment of files, from Placenzia, of very fair quality. The latter some "agricultural implements," consisting of pruning-knives and scissors, probably adapted to the vine cultivation, but of little merit as manufactured goods.

7. Of the three States in the next division—Turkey, Egypt, and Tunis—the two latter are only slender contributors in this Class. One or two articles contained in the list furnished by the Egyptian Government, and a few pairs of Tunisian scissors of the roughest workmanship, constitute the entire collections. Turkey, however, appears with articles of greater interest, such as scissors and hunting-knives—few in number, but well made. The knives have blades of Damascus steel; the scissors are of a singular form, and well deserve notice. They are so fashioned that each blade is half of a hollow cone, and the two therefore produce an entire cone when closed. The sides of each of these halves form the cutting-edges. They are well finished, and must have required much skill and great labour in their fabrication, rendering their cost high; but it does not appear that they possess any superior utility. It is not stated that they are so made for any special purpose; and if not, they involve considerable waste of toil and skill.

8. From China there are only a very few articles; but one of them is a singular instrument, and should be noticed as characteristic of the people from whose workshops it proceeds. It is a small blade of a triangular form, $2\frac{1}{4}$ inches

long, $1\frac{1}{4}$ inch wide, and $\frac{1}{4}$ inch thick, folding upon a slender, wooden, cylindrical handle, and is used as a razor for shaving a part of the head, according to general practice among the Chinese. It is not easy for us to comprehend how the operation can be successfully performed with such an implement; but it is said to be in common use among the natives, and to effect its purpose in their hands with the utmost nicety and despatch, and it cannot, therefore, be ill-adapted to its object. The workmanship is, to European eyes, of a very rude description, and even the surface of the metal displays none of the finish which is so diligently bestowed on many Chinese productions; but the edge it carries is certainly good, and its quality, no doubt, surpasses its appearance.

9. Lastly, the opposite hemisphere supplies, from the United States of America, a collection which, though not very extensive, contains some signal proofs of proficiency in such manufactures, and is strongly characteristic of the natural and social exigencies of the people from whom it comes. It consists of a few articles of the finer cutlery, but mainly of assortments of the larger edge-tools and implements, such as scythes and axes, and other objects of that nature. The former are finished with great care, and decorated with much costly ornament; but the Jury cannot pronounce them to be of the first degree of excellence in workmanship, and their temper is wanting in the hardness proper to the best cutlery. With respect to the other articles, however, the case is different. There is a set of joiner's tools, which, though few in number, are excellent; and the same may be said of the scythes, which are of the best quality. Good as these productions are, they are, perhaps, surpassed by the axes, to which nothing of the kind can be superior; they are admirably finished, and at the same time display all those more valuable qualities which are the necessary conditions and evidence of perfection in such commodities. It is evident that the great prevailing want of the population has created and encouraged to perfection, in its own neighbourhood, the trade which was to supply it.

The Jury believe that in the above general survey of the contributions presented by this class of the Exhibition, they have left nothing unmentioned of any note or merit; and having thus endeavoured to point out the several interesting features which belong to it, it only remains for them to add a list of the Awards.

1. Recommendation for Council Medal, confirmed by the Council of Chairmen:—

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Awarded.
United Kingdom	113	Spear and Jackson (Cl. XXII.)	For exhibition of circular saws, particularly one 60 in. in diameter, of marked and very superior excellence, manufactured by a process of peculiar merit, the result of a novel application of mechanical ingenuity recently effected by themselves.

2. Awards of Prize Medals:—

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
United Kingdom	23	Addis, J. B., jun. - - - -	Carving-tools.
France - - -	753	Arbeiter, M. - - - -	Cutlery.
United Kingdom	193	Blake and Parkin (Cl. XXII.) -	Saws and files.
United Kingdom	110A	Brookes, W., and Son (Cl. XXII.)	Edge-tools.
United States -	259	Brown and Wells - - - -	Tools.
United Kingdom	18	Buck, J. - - - -	Turning and other tools.
United Kingdom	192	Butcher, W. and S. (Cl. XXII.)	Edge-tools and razors.
United Kingdom	240	Butterley, Richard (Cl. XXII.)	Nickles.
United Kingdom	115	Cocker and Sons (Cl. XXII.) -	Files and edge-tools.
France - - -	129	Coulaut and Co. - - - -	Saws.
Wurtemberg -	57	Dittmar Brothers - - - -	Cutlery.
United Kingdom	27	Eastwood, George - - - -	A plane.
United Kingdom	203	Eyre, Ward, and Co. (Cl. XXII.)	Cutlery.
United Kingdom	114	Fenney, Frederick (Cl. XXII.)	Razors.
Austria - - -	420	Fischer, A. - - - -	Files.
France - - -	218	Froely, A. - - - -	Fine files.
United Kingdom	194	Gibbins and Sons (Cl. XXII.)	Scissors.
France - - -	851	Goldenberg, G., and Co. - -	Saws and tools.
France - - -	858	Guerra, sen. - - - -	Cutlery.
United Kingdom	226	Hague, S. (Cl. XXII.) - - -	Penknives.
Austria - - -	517	Haindl, A. - - - -	Cutlery.
United Kingdom	31	Hannah, A. - - - -	Augers, &c.
United Kingdom	146	Hardy, T. (Cl. XXII.) - - -	Dressing-case instruments.
Turkey - - -	1553	Hassan - - - -	Scissors.
Wurtemberg -	58	Hansen and Son - - - -	Scythes.
United Kingdom	135	Hawcroft and Sons (Cl. XXII.)	Razors.
Sweden & Norway	11	Højestrønd, C. V. - - - -	Razors.
Prussia - - -	187	Henkels, J. A. - - - -	Cutlery.
United Kingdom	188	Higginbotham, G. and W. (Cl. XXII.)	Scissors.
Prussia - - -	631	Hilger and Sons - - - -	Cutlery and scythes.
United Kingdom	47	Hill, Joseph V. - - - -	Saws.
United Kingdom	23	Hilliard and Chapman - - -	Cutlery.
Prussia - - -	637	Hoeller, A. and E. - - - -	Cutlery.
United Kingdom	181	Howarth, J. (Cl. XXII.) - - -	Edge-tools (engraving).
United Kingdom	228	Hunter, Edwin (Cl. XXII.) - -	Scissors.
United Kingdom	215	Hutton and Newton (Cl. XXII.)	Scythes and reaping-hooks.
Russia - - -	286	Lakovleff, Mme. Catharine -	Cutlery.
United Kingdom	191	Ibbotson Brothers (Cl. XXII.)	Cast-steel scythes, &c.
United Kingdom	209	Ibbotson, Richard (Cl. XXII.)	Saws.
Russia - - -	167	Imperial Artinsk Works - - -	Scythes.
United Kingdom	169A	Johnson, Cammell, & Co. (Cl. XXII.)	Files.
United Kingdom	5	King and Peach - - - -	Planes.
United Kingdom	161	Kirk and Warren (Cl. XXII.)	Files.
United Kingdom	14	Loy, William - - - -	Skates.
United Kingdom	15	Loy, W. T. - - - -	Cutlery.
United Kingdom	112	Makin, W. (Cl. XXII.) - - -	Rag-engine roller-bars, bottom-plates, and rag-knives.
Prussia - - -	617	Mannesmann, A. - - - -	Files.
United Kingdom	139	Mappin and Brothers (Cl. XXII.)	Cutlery.
United Kingdom	169	Marsden Brothers & Co. (Cl. XXII.)	Joiners' tools.
United Kingdom	132	Martin, Stephen (Cl. XXII.) -	Razors.
United Kingdom	32	Mathieson, A. - - - -	Joiners' tools.
United Kingdom	181	Matthews, W. (Cl. X.) - - -	Table-cutlery.
United Kingdom	7	Morton, J. and G. - - - -	Table-knives.
United Kingdom	13	Moseley and Sons - - - -	Planes.
United States -	323	North Wayne Scythe Company -	Scythes.
United Kingdom	149	Nowill, J., and Sons (Cl. XXII.)	Cutlery.
United Kingdom	233	Pence, H., and Co. (Cl. XXII.)	Saws.
United Kingdom	641	Philp and Whicker (Cl. X.) - -	Cutlery.
France - - -	348	Pisault, G. F. - - - -	Cutlery.
France - - -	969	Proutat and Co. - - - -	Fine files.

* Awarded a Prize Medal in Class XXII.

PRIZE MEDALS—*continued.*

Nation.	No. in Catalogue.	Name of Exhibitor	Objects Rewarded.
United Kingdom	690	Rodgers, J., and Sons (Cl. XXII.) -	Cutlery.
United Kingdom	198	Saynor and Sons (Cl. XXII.) -	Gardeners' knives.
Prussia - -	673	Schmolz, W., and Co. - -	Cutlery.
United Kingdom	10	Sharp Brothers and Co. - -	Table knives.
United States -	119	Simmons, D., and Co. - -	Edge tools.
United Kingdom	208	Slack, Sellers, and Co. (Cl. XXII.) -	Saws.
United Kingdom	204	Sorby, R., and Sons (Cl. XXII.) -	Edge-tools.
United Kingdom	214	Staniforth, Thomas (Cl. XXII.) -	Scythes and sickles.
United Kingdom	124	Steer and Webster (Cl. XXII.) -	Scissors.
Switzerland - -	63	Stotzer, Frederick - -	Fine files.
United Kingdom	39	Stubs, Peter - -	Small files.
Turkey - -	1550	Tahir - -	Scissors.
France - -	1027	Talabot and Co. - -	Scythes.
United Kingdom	129	Taylor, Henry (Cl. XXII.) -	Engravers' tools.
United Kingdom	2	Thornhill, Walter - -	Garden tools.
United Kingdom	38	Tomlin and Co. - -	Sickles and shears.
Belgium - -	128	*Troupin Brothers - -	Spiral cutters, &c.
United Kingdom	117	Turner, Thomas (Cl. XXII.) -	Files, saws, and outlery.
United Kingdom	190	Turton, Thos., and Sons (Cl. XXII.) -	Files.
United Kingdom	159	Unwin and Rodgers (Cl. XXII.) -	Cutlery.
United Kingdom	178	Unwin, W. (aged 16; Cl. XXII.) -	Sportsman's knife.
United Kingdom	17	Waldron and Sons - -	Scythes.
United Kingdom	148	Walters J., and Co. (Cl. XXII.) -	Cutlery.
United Kingdom	196	Ward and Payne (Cl. XXII.) -	Edge-tools.
Austria - -	448	Weinmeister, G. - -	Scythes.
Austria - -	573	Wertheim, F. - -	Tools.
United Kingdom	122	Wilkinson and Son (Cl. XXII.) -	Sheep shears.
United Kingdom	175	Wilkinson, T. and G. (Cl. XXII.) -	Scissors.
United Kingdom	195	Wilson and Sons (Cl. XXII.) -	Shoe and butchers' knives.
United Kingdom	125	Wostenholm, G., & Sons (Cl. XXII.) -	Cutlery.

* Awarded a Prize Medal in Class VI.

3. The Jury, however, scarcely feel that they should be doing complete justice to the spirit and exertions of some other exhibitors if they did not mention that, though their contributions have not appeared to be of quite such a character as to entitle them to the distinction of a Medal, they are still deserving of Honourable Mention; and they therefore desire to append the following list of names, to which such special recognition is fairly due.

Nation	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
United Kingdom	11	Addis, S. J. - - - -	Carving tools.
France - -	4	Alcan and Locatelli - - - -	Files.
United Kingdom	118	Algor, J. (Cl. XXII.) - - - -	Shoe knives.
United States -	97	Allen, A. B., and Co. - - - -	Tools.
United Kingdom	365	Atkin and Son (Cl. XXII.) - -	Joiners' tools.
United Kingdom	160	Atkinson and Marriott (Cl. XXII.) -	Files.
United Kingdom	20	Baker, William - - - -	Awl-blades.
United Kingdom	37	Barker, R. - - - -	Butchers' steels.
United Kingdom	48	Beach, W. - - - -	Cutlery.
United Kingdom	232	Bell, J. (Cl. XXII.) - - - -	Silver knives.
United Kingdom	212	Biggin and Sons (Cl. XXII.) - -	Saws.
Prussia - -	623	*Bleckmann, John Elias - - - -	Cutlery and files.

* Awarded Honourable Mention by Jury of Class XXII.

HONOURABLE MENTION—continued.

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
United Kingdom	130A	Bloomer and Phillips (Cl. XXII.)	Joiners' tools.
Prussia	633	*Bocker, R. and H.	Saws, files, &c.
United Kingdom	3	Bradford, R. and W.	Cutlery.
United Kingdom	26	Bradford, Samuel	Cutlery.
Prussia	621	†Braunschweig, J. A.	Tools.
United Kingdom	145	Briggs, S. (Cl. XXII.)	Awl blades.
United Kingdom	171	Brookes, J. (Cl. XXII.)	Dressing-case instruments.
United Kingdom	182	Brown and Sons (Cl. XXII.)	Joiners' tools.
Austria	129	Bubenitschek, J.	Cutlery.
Switzerland	270	Burkhardt, James	Razors.
United Kingdom	109	Carr, J., and Riley (Cl. XXII.)	Saws and files.
United Kingdom	142	Clayton, George (Cl. XXII.)	Table cutlery.
Prussia	628	Coppel, A.	Pen and pocket knives.
United Kingdom	165	Cousins and Sons (Cl. XXII.)	Scissors.
United Kingdom	217	Cutler, John (Cl. XXII.)	Edge-tools and shears.
United Kingdom	157	Deakin, George (Cl. XXII.)	Scissors (horse).
United Kingdom	110	Deakin, G., and Co. (Cl. XXII.)	Table cutlery.
United Kingdom	120	Ellin, T., and Co. (Cl. XXII.)	Table cutlery.
United Kingdom	151	Elliott, J. (Cl. XXII.)	Razors.
United Kingdom	156	Ellis, J. (Cl. XXII.)	Cutlery.
Austria	601A	Fischer, G.	Files.
United Kingdom	206	Fisher and Bramhall (Cl. XXII.)	Files.
United Kingdom	167	Flather, R. (Cl. XXII.)	Joiners' tools.
United Kingdom	219	Garfit and Son (Cl. XXII.)	Scythes and reaping-hooks.
Prussia	551	Gerresheim and Neef	Cutlery.
United Kingdom	123	Gilbert Brothers (Cl. XXII.)	Razors.
United Kingdom	187	Jowitt and Battie (Cl. XXII.)	Files.
Turkey	130A	Kirkar	Scissors.
United Kingdom	24	Knight and Sons	Turning-tools.
Saxony	30	Krumholz and Trinks	Cutlery.
Canada	121	Ladd, C. P.	Axes.
France	1641	Lanne, E.	Cutlery.
Canada	124	Leavitt, G.	Axes.
Austria	496	Lechner, M.	Files.
Switzerland	215	Lecoultré, J.	Razors.
United Kingdom	225	Leon, A. (Cl. XXII.)	Bowie knives.
Saxony	31	Levy, H.	Pearl-handle carvers.
United Kingdom	231	Linley, G. A. F. (Cl. XXII.)	Sheep-shears.
United Kingdom	128	Marples, R. (Cl. XXII.)	Joiners' tools.
United Kingdom	162	Marsh Brothers (Cl. XXII.)	Cutlery and edge-tools.
United Kingdom	35	Mathieson, T. A.	Plane.
United Kingdom	36	McPherson, C. and H.	Braces and bits.
Belgium	352	Monnoyer, Joseph Peter	Table cutlery.
Denmark	22	Naylor, J. W.	Files (various).
United Kingdom	133A	Newbould and Baidon (Cl. XXII.)	Table cutlery.
United Kingdom	137	Nicholson, W. (Cl. XXII.)	Cutlery.
Austria	444	Offner Brothers	Scythes.
Austria	445	Pamer, S.	Scythes.
United Kingdom	119	Parkin and Marshall (Cl. XXII.)	Table cutlery.
United Kingdom	223	Peace, Henry (Cl. XXII.)	Files.
Austria	446	Penz, J.	Scythes.
Prussia	619	Pickardt, G.	Files.
Portugal	632	Polycarpo, A.	Garden-knives.
Hamburgh	43	Ritter, W.	Augers, &c.
Austria	552	Rosler, J.	Cutlery.
United Kingdom	34	Sanders, G.	Razor-strop.
Prussia	640	Schwarte, J. D.	Cutlery.
Canada	122	Scott and Glasford	Axes.

* Awarded Prize Medal by Jury of Class XXII.

† Awarded Honourable Mention by Jury of Class XXII.

HONOURABLE MENTION—*continued.*

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
United Kingdom	147	Sellers, J. (Cl. XXII.) - - -	Cutlery.
Canada - -	123	Shaw, Samuel - - - - -	Axes.
United Kingdom	158	Slagg, H. W. (Cl. XXII.) - - -	Sickles.
Turkey - -	1303	Sophia, Province of - - - - -	Scissors.
United Kingdom	21	Stewart and Co. - - - - -	Razor-guard.
Sweden & Norway	12A	Stille, A. - - - - -	Razors, &c.
Austria - -	559	Stuckhart, John - - - - -	Cutlery.
France - -	1496	Tabourdeau, P. - - - - -	Cutlery.
France - -	1024	Taborin, P. F. - - - - -	Files.
United Kingdom	205	Tasker, Henry (Cl. XXII.) - - -	Saws.
United Kingdom	211	Taylor Brothers (Cl. XXII.) - - -	Saws.
Prussia - -	671	Thomas, C. - - - - -	Cutlery.
Canada - -	120	Wallace, A. - - - - -	Planes.
United Kingdom	187	Warburton and Co. (Cl. XXII.) - - -	Augers.
United Kingdom	631A	* Weiss and Son (Cl. X.) - - -	Cutlery.
Austria - -	572	Weiss, J., and Sons - - - - -	Tools.
United Kingdom	134	Winks, B., and Sons (Cl. XXII.) - - -	Razors.
United Kingdom	8	Wood, J. - - - - -	Razors.
Spain - -	256A	Ybarra, J. - - - - -	Files.
Austria - -	450	Zeitlinger, J. A. - - - - -	Scythes.

* Awarded Prize Medal by Jury of Class Xc.

WHARNCLIFFE, *Reporter.**October 1851.*

CLASS XXII.

REPORT ON IRON AND GENERAL HARDWARE.

Jury.

- Hon. HORACE GREELEY, *Chairman*, United States ; Editor.
 W. BIRD, *Deputy Chairman*, 5 Martin's Lane, Cannon Street, City ; Iron Merchant.
 ARTHUR ADAMS, Walsall, Hardware Merchant.
 — AUER, Austria.
 W. DYCE, R.A., *Reporter*, 2 Fitzroy Square.
 G. GOLDENBERG, France ; Manufacturer ; Member of Central Jury, &c.
 DON MANUEL HEREDIA, Spain ; Merchant.
 E. STIRLING HOWARD, Sheffield ; Sheffield Plate Manufacturer.
 GEORGE SHAW, Cannon Street, Birmingham ; Patent Agent.
 FERD. SPITAKIS, Belgium ; Member of Senate, Vice-President of Chamber of Commerce, Charleroi.
 Dr. F. STEINBEIS, Zollverein ; Member of the Board of Trade and Commerce.
 HENRY VAN WART, Birmingham ; Merchant.

Associates.

- Sir H. R. H. BISHOP, 13 Cambridge Street, Hyde Park ; Professor of Music at Oxford. (Juror in Class Xa.)
 WARREN DE LA RUE, Ph. D., F.R.S., F.R.A.S., F.C.S., 7 St. Mary's Road, Canonbury, Islington ; Manufacturer of Ornamental Stationery. (Juror in Class XXIX.)
 A. W. HOFFMAN, Ph. D., F.R.S., F.C.S., Zollverein ; College of Chemistry, Oxford Street ; Professor of Chemistry. (Juror in Class XXIX.)
 Chevalier NEUKOMM, Zollverein ; 9 Carlton Terrace. (Juror in Class Xa.)
 RICHARD REDGRAVE, R.A., 18 Hyde Park Gate, South Kensington Gore ; Artist. (Juror in Class XXX.)
 Dr. SCHAFFHAUTL ; Zollverein ; Professor of Geology, Mining, and Metallurgy. (Juror in Class Xa.)
 W. WYON, R.A., Her Majesty's Mint Medallist. (Juror in Class XXX.)

THE range of Class XXII. may be said to be coextensive with the employment of the baser metals in manufacture. In that respect, it forms a *nucleus* round which, either wholly, or in certain particulars, various other classes, to the number of seven or eight, are distributed ; and which are separated from it on grounds, partly of convenience, and partly of the subjection of metal-working, as such, to the purposes of specific branches of industry or science.

Owing, however, to the difficulty, in many cases, of making such a separation, the range of Class XXII. has been limited rather with respect to the number of objects embraced by it, than to their nature ; among which, in point of fact, there are included examples either analogous to, or identical in all essential

particulars with, a considerable portion of those exhibited in Classes I, V, VI., VIII., IX, X, XXI, XXIX., and XXX. Thus, for example, although it belongs to Class I. to determine the merits of iron, steel, copper, or other wire, under the head of "Metals in their progress to finished manufactures," the same wire, when twisted or woven, comes under Class XXII., in which its merits, with this new quality superadded, must again be tested by a rule involving a judgment on the material itself. Then again, Class XXII. abounds, if not with machines, at least with machine-like contrivances, and with implements and tools, which identify it with several of the Classes above enumerated. In the case of metallic sculpture, this identity with Class XXX. is especially to be remarked. As a general rule, it was thought that the Jury of Class XXII. might with advantage confine themselves to the consideration of art as it is applied to ornamental purposes; but practically it was by no means easy, if indeed it was possible, to define in every respect the limits between ornamental art and fine art; and besides, it was to be borne in mind, that statues in metal and other similar works of art, while they are to be judged of æsthetically, are also, as the result of various metallurgic operations, amenable to the criticism of the founder and metal-worker, and may have in that respect (as the Jury believe to be the case in more than one instance in the Exhibition) a merit which, though not independent of artistic excellence, is nevertheless separable from it. On this ground, nearly the whole of the sculptures in metal have passed under the review of this Jury: and they would remark, with respect to this and other cases, that although their duties would have been lightened by a more exact definition of the limits of their Class, and, in all instances in which it was practicable, by a statement of the particular merit on which the exhibitor wished to found his claim to reward, yet the exhibitors of those articles which have undergone the scrutiny of more than one Jury will have no reason to complain of an arrangement which, at the least, must have tended to enlarge the grounds of criticism, and make more fully known their claims to notice.

The objects included in Class XXII., considered with reference to material, range themselves for the most part under the heads of:—

1. Brass Manufacture.
2. Copper, Zinc, Tin, Pewter, and General Brazieri.
3. Iron-work.
4. Steel Manufactures.

The following particulars being comprehended under these heads:—

1. *Brass Manufactures.*

- a. Cabinet and general brass foundry: consisting of hinges, fastenings, escutcheons, bell-pulls, brass foundry used in ships, knockers, door-springs, castors, &c.
- b. Plumbers' brass foundry: cocks, valves, pumps, water-closets, &c.
- c. Stamped brass: cornices, curtain-bands, finger-plates, &c.
- d. Gas fittings, brackets, chandeliers, pillars, gas-burners, and consumers' meters, &c.
- e. Tubing, plain and ornamental.

- f.* Metallic bedsteads.
- g.* Chandeliers, lamps and candelabra for oil, candles, or camphine, and lamp-chains.
- h.* Railway and carriage brass foundry, and signal lamps and lanterns.
- i.* Bronze figures, busts, and chimney ornaments.
- k.* Bells : house, church, ship, table, &c., and alarums.
- l.* Candlesticks, table and bedroom.
- m.* Monumental brasses, and ecclesiastical brass-work.
- n.* Copper-plates for engravers.
- o.* Miscellaneous : including pins, nails, wire-gauze, bird-cages, hooks and eyes, wire baskets, and ropes.

2. *Copper, Zinc, Tin, Pewter, &c.*

- a.* Kettles, coal-scuttles, coppers, saucepans, steamers, plate-warmers, &c.
- b.* Bronzed tea and coffee-urns, kettles, &c.
- c.* Tubing : copper, tin, lead, &c.
- d.* Pewter, German silver and Britannia metal teapots, basins, dishes, spoons, ladles, inkstands, &c.
- e.* Coffin furniture : plates, escutcheons, &c.
- f.* Zinc articles generally.

3. *Iron-work.*

- a.* Stoves, grates, fenders, and fire-irons, kitchen ranges, cooking apparatus, smoke-jacks.
- b.* Warming apparatus for halls and rooms, ships, &c., either by water, coal, coke, wood, charcoal, or gas.
- c.* Shower, vapour, air, and warm-water baths.
- d.* Ventilators : metallic and others.
- e.* Pipes and gutters, &c.
- f.* Locks and hinges.
- g.* General ironmongery.
- h.* Ice machines.
- i.* Knife-cleaning machines.
- k.* Letter-copying machines and presses.
- l.* Saddlers' ironmongery.
- m.* Hollow ware, cast and wrought, tinned, and enamelled.
- n.* Spades, shovels, pickaxes, hoes, rakes, garden-rollers, &c.
- o.* Nails : cut, cast, and wrought.
- p.* Screws and railway bolts, &c.
- q.* Iron safes, cash-boxes, fire-proof and others.
- r.* Horse-shoes.
- s.* Gates, railings, hurdles, and stable fittings.
- t.* Mangles, washing-machines, &c.
- u.* Iron bedsteads, garden seats, &c.
- v.* Castings in iron.

k. Steel Manufacture.

- a. Tools and heavy steel toys, hammers, vices, &c.
- b. Steel ornaments, light fancy steel toys, brooches, huckles, &c.
- c. Steel pens and metallic pens of other kinds.
- d. Needles, fish-hooks and fishing tackle.

Besides these, there must be included also a number of objects fabricated of mixed materials, such as buttons—metallic, Florentine, pearl, bone, &c., and other productions coming under the usual denomination of hardware.

Considered in another aspect, the articles comprehended in Class XXII. may be divided into those intended to supply the necessary and absolute requirements of large industrial populations, and generally to minister to the conveniences of society; and those which, either partially or wholly, are created to meet the demands of taste and refinement among the wealthier classes of the community.

A large proportion of its contents, accordingly, consists of articles of mere utility and convenience, the merits of which were to be tested by such considerations as fitness for their professed purpose, and excellence of material and workmanship.

To these tests, the Jury believe it would have been advantageous to have added a comparison of prices; but they found it necessary to abstain from introducing this element into the grounds of their decisions, partly on account of the difficulty of doing so, and partly in deference to the instructions furnished to them by the Council of Chairmen.

They must also add that, after much deliberation, they felt themselves compelled to adopt a rule for determining the merits of inventions, and of improvements on existing contrivances, which, in many cases, they admit to have been inadequate. Numerous instances, of course, there were of contrivances in which the adaptation of the means to the end was so obvious that no question could be made of it. Others there were in which the actual working of the invention was witnessed; but there was a third class, respecting which the decisions of the Jury, it was felt, must be, *pro tanto*, conditional and contingent on the efficacy of the contrivance, unless—and this was considered to be impracticable—they were enabled to form an opinion after actual experiment.

This question was, in the first instance, raised in the case of lamps for oil or camphine, on the occasion of a consultation between this Jury and the Jury of Class XXIX.* on that point; and it was subsequently decided, in the first place, that there were practical reasons, which it is here unnecessary to state, against undertaking a course of experiments on the comparative advantages in point of economy and the illuminating power of the lamps in question; and secondly, that, supposing it to be otherwise (though indeed the same or similar obstacles existed in other cases), the Jury must, in fairness to exhibitors in all the sections of this Class, have resorted to experiment where any doubt arose, and thus have protracted their labours to an inordinate length.

Among the cases to which the Jury refer, they may advert more particularly to contrivances for preventing smoke, kitchen ranges professing great economy in

* See Appendix (A).

fuel and other advantages, apparatus for heating and cooking by gas, and such like.

In some instances, indeed, experiment would have rendered no assistance. In the manufacture of steel pens, for example, the improvements introduced by particular houses (beyond a certain point of excellence long since passed by all) are, for the most part, merely differences of form, on the advantages of which, adapted as they are to suit different characters of hand-writing, very few persons would be found to agree. With respect, however, to all the cases to which they refer, the Jury believe that, short of actual experiment, they have neglected no means by which they were likely to arrive at a sound conclusion. And besides, it must not be forgotten that even in these and similar instances the invention or contrivance is not the chief, nor always the sole element of merit on which they were called upon to pronounce a judgment.

Next in order to articles of mere utility and convenience, may be ranked those in which use is combined with a greater or less amount of ornament. These constitute the largest proportion of the objects in Class XXII.; besides which there is a third section, which consists of articles either solely or chiefly ornamental; including such works of fine art as are or may be employed for decorative purposes.

The whole number of exhibitors in this Class is upwards of 1200, including those who, chiefly exhibiting in other Classes, have also sent articles which more or less come under the denomination of hardware. This number also includes exhibitors of certain objects, such as metallic combs for weaving, and mangles, which were ultimately referred to other Juries.

The proportions in which various countries have contributed examples of all kinds may be gathered from the following statement of the relative number of exhibitors :—

Two-thirds of the whole number of contributors belong to the United Kingdom ; the remaining third are thus distributed :—

From France	-	-	-	-	about one-fourth.
From States of Zollverein	-	-	-	-	rather above ditto.
From Austria	-	-	-	-	about one-eighth.
From Belgium	-	-	-	-	about one-sixteenth.
From Canada	-	-	-	-	ditto ditto.
From United States of America	-	-	-	-	ditto ditto.

And the remainder from India, China, Denmark, Spain, Sweden and Norway, Russia, Switzerland, Jersey and Guernsey.

From the extreme difficulty of classifying so multifarious an assemblage of objects as are included in this department of the Exhibition, an approximation only can be made to the proportions in which British and foreign exhibitors have contributed examples in specific branches of industry ; but the following table will, perhaps, suffice to show how the case stands with the more noticeable kinds of manufacture :—

NUMBER OF EXHIBITORS, BRITISH AND FOREIGN, of the principal objects in CLASS XXII.

Kind of Objects.	No. of Exhibitors.	
	British.	Foreign.
Anvils, vices, &c.	4	3
Baths of all kinds	16	1
Bedsteads, metallic	15	7
Bellows, acoustic tubes, &c.	7	3
Bells, church, house, &c.	8	11
Bird-cages	6	6
Brass foundry, various	16	6
Bronzes, bronze wares, and castings	9	63
Buttons, various kinds	20	13
Chandeliers, metallic	9	6
Copying machines, presses, &c.	18	3
Enamelled and tin ware	4	4
Filters	4	1
Gas meters	12	-
Gas stoves for cooking, &c., and gas fittings	14	4
Grates, fenders, fire-irons, cooking apparatus, iron castings, &c.	84	25
Hardware, various	54	26
Horse-shoes	10	1
Japanned ware	6	6
Jews'-harps	-	5
Kitchen ranges	14	-
Knife-cleaning machines	4	-
Lamps, various	28	15
Letter boxes	4	-
Locks	30	25
Monumental brasses and ecclesiastical brass-work	9	1
Nails, all sorts	4	24
Needles and pins	8	4
Ovens	4	4
Percussion caps	2	4
Pewter articles	2	1
Powder flasks	2	1
Safes, &c.	8	5
Screws	4	4
Steel and other metallic pens	11	1
Steel wares	12	14
Stoves	37	25
Tea-kettles and urns	9	1
Tubing, various, copper, tin, lead, &c.	6	1
Water-closets	10	1
Wire gauge, wire cloth, wire ropes, netting, &c.	21	10
Zinc castings and general manufactures	4	20

The foregoing table includes those cases only in which a comparison of the kind proposed may be instituted, or in which the articles exhibited are sufficient in number to merit notice as the basis of such a comparison; but in both the British and foreign departments there is, besides, a great variety of articles of a miscellaneous description, such as specific inventions or contrivances; curiosities exhibiting the processes of particular manufactures or the skill of artificers; and, especially in the foreign department, examples, which, though unimportant in themselves, are interesting as giving completeness to the picture which, in conjunction with others, they afford us of the entire character of the industry of particular localities. And with respect to these last, the Jury desire to express their appreciation of the liberal spirit manifested by those among the exhibitors of them, whose sole motive must have been to render the display of their national and local manufactures as complete as possible.

On a general review of the contents of Class XXII., the Jury observe first, that, although the contributions from the United Kingdom are twice as great as those from all other countries, and, with trifling exceptions, consist of examples in all branches of metallic manufactures, the character of the contributions seems to indicate that British hardware manufacture is, at present, chiefly pre-eminent for excellence of workmanship and material, contrivance, ingenuity, mechanical skill, and other qualities which, *independently of taste*, give value to productions intended to supply the every-day wants and conveniences of life. There seems to be no doubt that in this class of manufactures, in which taste is either not a necessary element, or applicable only to a very limited extent, the palm of superiority must be accorded to the United Kingdom. In particular instances there are, of course, exceptions to this rule; but, on the whole, with the advantages of cheap material, superior and powerful machinery, and a commercial demand of such extent as to insure, while it invigorates and directs, the efforts to supply, British hardware of the commoner sort stands unrivalled in its variety, its utility, and excellence of workmanship, and in its adaptation to the wants and wishes of every class of purchasers.

In manufactures of a higher order, which involve the application of tasteful design and ornamentation, the merit of British productions, though very unequal, is, on the whole, less pre-eminent. Whatever amount of evidence there may be that the persons who furnish the designs are deficient in artistic education and intelligence, it seems to be almost beyond question that the inferiority of British hardware in point of taste is, in many instances, more immediately traceable to other causes. One of the chief of these the Jury conceive to be the artistic ignorance of workmen. There may be observed everywhere the fruits of a disposition among artificers to consider the due development of artistic design less important than a kind of mechanical high polish and finish, which are in all cases thought to be essential to excellence of workmanship. The Jury are by no means disposed to undervalue beauty of workmanship; on the contrary, they consider it essential to the perfection of manufacture; but it is quite clear that in proportion as tasteful design becomes an element in that perfection, mechanical execution must be subservient to its due expression and development. Unless this subserviency be strictly maintained, no amount of skill on the part of the designer can avail. Accurate modelling, for instance, of the features of a face or the toes of a foot, is thrown away, if the workman, prepossessed with his peculiar notions of finish, is to be at liberty to obliterate both features and toes before he can attain the degree of polish which he deems creditable and necessary.

In the cases to which the Jury refer, it is obvious that the deficiency arises from a want of proper understanding between the designer and the parties who execute the work. In an early stage of society,—as indeed must always, to a great extent, be the case in the highest kinds of art,—the artist and artificer, the designer and manufacturer, are the same individuals. This state of things, though on the whole highly favourable to the influence of taste on works of industry, is incompatible with low prices, or (which is the same thing) with extensive production. In particular, the difficulty and tediousness of the manipulation of materials so unyielding as metallic substances, while they place a limit on production as it respects quantity, have a tendency to confine the

character of the things produced to the two extremes of rudeness and elaboration. So long as the cheapness of an article was attained, not by increasing the mechanical facilities for its production, but by diminishing the amount of hand labour bestowed upon it, metal-working, so far as the mass of the people was concerned, could never extend itself beyond the few indispensable requisites of every-day life, which to be cheap enough must be of the rudest description,—such in fact as we still see in the specimens of household and other utensils among the Oriental manufactures now exhibited. With respect to the wealthier classes, on the other hand, the inducements lay in the opposite direction; it was the interest of the artificer to enhance the value of his productions by elaborate and varied workmanship of an ornamental kind, for which alone he was likely to obtain adequate remuneration. Thus every single production, on which labour beyond a certain indispensable amount was bestowed, partook more or less of the character of a specific work of art, identified with the producer as an artist, and reproducible only by a reiteration of the original process by the same or equally competent hands.

It is not difficult to anticipate the effects which the substitution of machinery for hand labour must produce on this *aboriginal* character of industry. However great the improvement likely to arise, both with respect to quality and cheapness, in the fabrication of objects of utility, it was inevitable that, for a time at least, a deterioration should take place in ornamented manufactures. The old relation, or rather identity, between the artist and artificer must cease to exist under a system, in which the application of ornament depended no longer solely on the skill of individual artist-workmen, but on the capabilities of mechanism, or chiefly so. The influence of taste, accordingly, had to be exerted by new methods, which, from the necessities of the case, could only develop themselves slowly.

In the first place, the earliest efforts of machine labour are directed to the production of objects in their simplest and least ornate form. Imperfection of machinery, and the primary purpose of machine labour, viz., cheap and extensive production, both tend to impose this condition, and to impart to manufactures a mechanical and *unartistic* character. It is not only the interest of the manufacturer, but matter of necessity, in the first instance, to exclude whatever cannot be easily and cheaply executed; and thus, on the application of machinery to any new branch of industry, there occurs in almost every case an interval during which the services of the designer are reduced to their *minimum*, even if they are not, for the time, virtually dispensed with. But apart from this consideration, it is to be remarked, secondly, that the application of machinery brings with it new difficulties in the way of taste. On the one hand, the conceptions of the designer are not, as before, limited solely by his skill as a workman. The capabilities of each particular process of manufacture have now to be studied; and the adaptation of design to these, forms, of itself, an art of considerable difficulty and of slow acquirement, fettered as it is by questions of economy in execution, and embarrassed and impeded by continual improvements, or, at least, changes in the machinery or process employed. On the other hand, the *mise en fabrique* and the finishing processes, if they do not necessarily in most cases fall into the hands of persons *artistically* disqualified, do so, at least, in the first instance;

and this obstacle to the due execution of ornamental work not only becomes inveterate by use, but has mistaken views of economy in favour of its perpetuation.

It is, at least, a fact, that while the application of ornament to many hardware manufactures has gradually become more extensive and of a higher order, the character of the individuals employed in the workshops, with respect to artistic intelligence, has not been proportionably elevated. They, for the most part, retain the ideas belonging to the primary, mechanical, and generally *unartistic* condition of manufactures. While our designers have advanced, those who execute or finish their designs, have remained stationary; hence, the appearance of which the Jury have so frequently had occasion to notice instances, of a mechanical high polish, which has obliterated or spoiled the details of form or surface, evidently intended by the designer.

This is not, however, an evil peculiar to the hardware manufactures of this country. In France, in particular, some years ago, the artistic ignorance of the workmen employed in the chiselling and finishing of bronze and other metallic wares, was found to be so serious an obstacle to improvement, that it was considered necessary to establish a school for the express purpose of affording to artificers instruction in drawing and modelling, combined with the practice of chasing, chiselling, and finishing castings in metal. And it may be noticed, that the Trades' Schools of Prussia and Bavaria are expressly based on a recognition of the principle, that if the modern exigencies of manufacture require a separation between the designer and artificer, the influence of the former can in no other way be duly maintained than by teaching to the artificer so much of design as will enable him to appreciate the intentions of the designer; and to the designer, so much of manufacturing processes as will secure the practicability and fitness of his designs.

The Jury are, however, by no means inclined to take a discouraging view of the position of the ornamented hardware manufactures of the United Kingdom.

There was no reason to expect, on general grounds, that an entirely new system of manufacture should be perfected otherwise than gradually, or be exempt from the characteristics of progress which have always marked the advancement of art and industry. All experience would have been belied, had the progress of England, the parent of this new system, been other than it has. Our industrial system has been gradually and entirely remodelled. Step by step as machinery, and the various reproductive facilities of modern times, made their encroachments on the old methods of hand labour, we were, in every case, as it were thrown back on the primitive condition of labour. That very want of skill and inexperience which, in early stages of society, oblige men to busy themselves solely or chiefly about the necessary, the useful, or the convenient, restrained the earlier efforts of machine labour, and gave it the same bias. And if we consider the vast commercial advantages reaped by this country from unornamented machine-made wares, and that the deterioration of the ornamented sorts was, and is now to a large extent, commercially speaking, of no importance, because counterbalanced in the eyes of the majority of purchasers, by other qualities more easily appreciated, we shall be at no loss to account for the present general inferiority of British hardware, in point of taste, to that of some other countries. It is obviously

an inferiority, not so much positive and permanent, as arising out of a particular stage of progress. Commercial interest has not yet, in this country, forced on manufacturers the consideration of questions of taste, to the same extent as has been the case elsewhere. It is only, indeed, within comparatively a few years, that the national success in the market has been generally even suspected to be endangered by want of taste.

If, then, the due adjustment of the *mechanical* and the *artistic* elements of perfection in manufacture is a problem yet to be solved in this country, it is because the point of progress has not yet been reached at which its solution becomes possible; if that solution has been postponed beyond what may appear a reasonable period, it is because the mechanical element, bringing with it new and unheard-of advantages, commercial and utilitarian, has been borne along on an overwhelming tide of success, and carried beyond its proper bounds, closing up for the time, or obstructing more or less the avenues to the influence of taste. If due means for securing that influence have not been used, or only partially so, it is because the commercial necessity for using them has been either not felt at all, or felt partially. But there is nothing unhealthy in this state of things; the utmost that can be said, is, that the manufactures of the United Kingdom, with respect to taste, are in a state of transition. The artistic element has begun to assert its claims; and if its working is for the present uncertain, irregular, vague, and unequal; if British manufactures exhibit for the present, at once the most successful and the most abortive attempts at ornamentation; if the means used to obtain designs are often erroneous and illegitimate, and the modes of working them inadequate, it is the consequence of a state of transition resulting from the introduction of a new, and in some respects, antagonistic element, which has not yet secured its position.

These observations will, in part, have anticipated some of the remarks which, in the second place, the Jury have to make on the general aspect of the objects contributed to Class XXII. by the more eminent continental nations. It must be noticed, however, in addition, that as the industry of the United Kingdom owes its existence to private enterprise, so its course has been determined solely by commercial demand, and the current of ingenuity. Fiscal regulations may have impeded its extension in certain directions; but its condition is, to no appreciable extent traceable to the direct fostering care, or to the controlling influence of the Government. It has taken its own course. It is a vigorous and independent manufacturing system arising out of the substitution of machinery for hand labour, wherever it was practicable; a system which, not only impelled by necessity, but induced by interest, developed itself solely or chiefly in the first instance in the direction of the indispensable, the useful, and the convenient; and which, by a natural progression, is tending towards the ornamental; and is now, in fact, exhibiting signs of the fermentation consequent on the insertion of the new leaven of taste and refinement. Whatever its progress in particular cases, it has followed this course on the whole; and in this respect it presents a contrast to the industry of some of the more powerful nations of the continent of Europe. That of France, in particular, may be said to have proceeded by an opposite course. It started with an artistic system of manufacture, patronized and supported by Government influence and resources; and its progress has, for the most

part, been downwards from the supply of the artificial demands of luxury and refinement, to the necessary demands of utility and comfort. There can be no question whatever about the pre-eminent excellence of the national ornamented manufactures of France ; but there is as little doubt that commercially considered, this pre-eminence is to a great extent artificially maintained. It is not so much the result of a healthy, independent, self-relying, and self-supporting system of manufacture of which machinery is the basis, and which owes its existence to private enterprise and capital, and its direction to commercial demand, as of a patronage and an expenditure, which disregard both cost and immediate profit.

The Jury, however, must not be considered to offer any opinion here on the question whether it be advisable in any case, that a Government should apply its influence and resources to the promotion of certain branches of industry, or to speak more strictly, should monopolise those branches :—they are desirous merely of directing attention to the fact that this is done in France, and some other continental countries (as, for example, in Prussia) ; because they believe that a strong characteristic of French industry is traceable to this source. It is to a great extent artistic, rather than workmanlike. The artistic element hinders the development of the mechanical ; precisely the reverse of the case in the United Kingdom, in which the mechanical overwhelms or overspreads the artistic. In the former, artistic skill is the starting point ; in the latter, mechanical. In the one, artistic skill is indigenous ; mechanical, for the most part exotic ; in the other, the reverse is generally true.

There are, of course, exceptions, some of them remarkable in both countries ; but in general it will be found that in France there is a tendency to emulate the national manufactures, and to confine production to the supply of expensive luxuries, which is injurious to the development of useful industry ; while in the United Kingdom the utilitarian principle has tended to hinder the development of taste. The exceptions are, however, hopeful on both sides ; and if it cannot be said that as yet either has solved the problem how the *artistic* and the *mechanical* elements of industrial perfection are to be duly adjusted, a great step has been gained towards its solution by the opportunities of comparison afforded by the Exhibition of 1851, which, in that respect, the Jury are confident must prove beneficial to the general interests of industry and manufacture.

In the foregoing remarks on ornamented manufactures, reference has been chiefly made to those of France and of the United Kingdom, because the Jury conceived that, so far as the points under consideration were concerned, these two might be safely assumed as representatives of opposite systems, which are more or less followed, in either direction, by other countries. More obvious extremes might, perhaps, have been found in the United States of America, on the one side, and some Oriental nations on the other ; the former following almost exclusively the utilitarian and mechanical system—the latter, the artistic ; but the examples adduced will admit of a sufficiently extended application.

It must now, however, be noticed that, in the view taken by the Jury of the contents of Class XXII., they have gone no further than the actual character of the objects brought before them. They have taken them as they found them ; and, placing them all, for the time, on an equal footing, have estimated their merits by simple comparison. It was obvious, indeed, that the mere *actualities*

of the Exhibition must, in the main, be the sole objects of their criticism: the actual merit of a work independently of the circumstances under which it was produced must be the ground of their award. No other course was open to them but this. Wherever merit appeared it must be recognized for its own sake: when a comparison was instituted between the similar productions of different countries, the basis of such comparison must be confined within the walls of the Exhibition.

It is proper, therefore, to advert to some consequences resulting from this necessity imposed on the Jury.

In the first place, single specimens of a manufacture have come before them, of the highest merit in themselves, which, however, are unaccompanied by any evidence either that the high excellence they display is not exceptional, or that a profitable industry, of the kind to which they belong, has any existence in the country whence they are sent. Yet these single examples, perhaps the unusual fruit of individual skill, are brought into comparison and competition with works of the same sort produced in other countries in the ordinary course of commercial enterprise.

To take another case: contributions, which, though few in number, are yet sufficient to evince the existence of a branch of industry, come from countries where they can be produced only at a cost which places them beyond the reach of moderate fortunes. In such a case it is quite clear that the amount of hand labour bestowed on ornamentation and finish becomes a secondary consideration; yet these must be compared, in point of actual merit, with manufactures of the same kind produced under a rigid economy of material and labour, and intended for ordinary purchasers.

Or, again: specimens of manufacture are contributed by Government establishments, in which the cost of production, and, at least, immediate profits are disregarded, which nevertheless enter into competition with the efforts of a self-supporting industry in other countries.

Cases such as these make it evident that an actual superiority in the specimens exhibited cannot be assumed as the index of an industrial and commercial superiority, unless it can be shown that those specimens have been produced under the ordinary conditions of commercial enterprise. No one doubts that a branch of ornamented manufacture may be carried to the highest perfection, both mechanical and artistic, in any country, provided due means are used for that purpose, with little or no regard to outlay and profit. It is almost a matter of course that manufactures so protected should be superior to those which are carried on under all the difficulties and embarrassing obstacles that beset remunerative industry. The wonder is rather that the produce of the latter, having no allowance made for the disadvantages it labours under, should be able to bear so well a comparison in point of actual results.

The Jury, then, while they have willingly rewarded merit wherever it has appeared, have at the same time regarded that merit with greater satisfaction when it was found in the productions of a self-supporting and remunerative industry. They confess that they have looked with greater interest among the contributions from abroad for evidences of a healthy, useful, widely-extended, and self-supporting industry, than for remarkable proofs of skill in particular manufactures. On this point they wish that it had been in their power to have entered

at some length; but so many questions are involved in the consideration of it which are foreign to the purpose of this Report, that they must content themselves with a very general statement of some observations they have made.

In Egypt, Persia, Turkey, Tunis, and India, metallurgy and a certain knowledge of alloys date from remote periods; but, as has been already noticed, productions in metal analogous to European hardware of the commoner sorts are of the rudest description, though excellent in material and generally graceful in form. For the most part there is no step between the manufacture of the rudest contrivances and that of articles of the most costly and splendid character. The objects wrought in metal are either on the one hand as cheap as the material and the smallest possible amount of labour permit them to be, or on the other as costly as elaboration can render them. It is to be regretted that the contributions from China are too incomplete to give an adequate idea of the hardware manufactures of that remarkable country. They certainly take a considerable range; and, considering the ingenuity, the inventive genius, and the peculiar domestic habits of the people, may with some reason be supposed to make a considerable approximation to the more or less utilitarian character of European manufacture.

In Greece and Italy the same stagnant traditional industry in metals seems to prevail. From the former nothing, and from the latter nothing of any note, is contributed to Class XXII. It is to be regretted, indeed, that specimens of the rude, though in some respects, beautiful metallic manufactures of Italy, in use among the common people, such as lamps, braziers, brass, copper, and tinned copper vessels, have not been sent. There is nothing, however, in their place to indicate the existence of a more advanced condition of this branch of industry. With Italy, Spain may be classed; a country so rich in metallic ores that the very backward state of its manufactures in metal may well excite surprise. The few contributions from Spain, however, give evidence of both the desire and the power to improve that kind of industry; and possibly, when means of easy and rapid transit are obtained, the natural advantages of the country may be turned to better account, and this species of industry rise to importance.

Austria, the States of the Zollverein, and Belgium afford ample proofs of activity. The first-named country, in particular, exhibits remarkable productive vigour, and her manufactures take a range which shows how firmly and deeply industrial and commercial tendencies have taken root. Iron manufactures appear to be in a most flourishing condition, to which the superior quality of Austrian iron, notwithstanding its costliness for ordinary purposes, no doubt contributes. Considerable surprise, indeed, has been created by the extent and the quality of production in the branches of industry employing iron, such as nail-making, the manufacture of scythes, pickaxes, hatchets, axes, saws, and other cutting instruments, shovels, hoes, and tools of various sorts.

One branch of hardware industry, viz., the manufacture of Jews'-harps, is represented solely by Austria; and, judging from the number of exhibitors, must form a trade of considerable extent.

The iron wire, wire ropes, wrought-iron tubes, and lead drawn pipes, enamelled iron ware, and wrought and cast iron generally, are particularly deserving of notice.

The contributions from the States of the Zollverein are also such as to indicate

an active state of commercial enterprise in certain directions. They consist chiefly of cheap hardware, including toys and various articles made of japanned tin, lead, pewter, and other materials, common cutlery and ironmongery, buttons, &c., the cheapness of which, notwithstanding the generally high price of the raw materials, enables them successfully to maintain their place in neutral markets. Some excellent specimens of brass and iron wire, manufactured in various ways, also appear among the contributions from the States of the Zollverein.

Belgium, though not contributing largely to Class XXII., is distinguished, as will be noticed hereafter, for the great extent and excellence of her manufacture of nails, and the application of zinc to a variety of useful and decorative purposes. The latter is due principally to the efforts of the Société des Mines et Fondrières de Zinc de la Vieille Montagne, of Liège, which raises and manufactures the metal, and exports it to a large extent. The ores of Belgium and Silesia are abundant and easily worked; and the many uses to which the metal, its ores, alloys, and oxides may be applied, have created for it of late years a rapid and extensive consumption. In close proximity to Belgium, at Stolberg, in Rhenish Prussia, a district rich in blende and lead ore, there are the newly-opened, and at present actively-worked mines and manufactures of spelter; and also at Verviers, the Société de la Nouvelle Montagne and other Companies have been formed to meet the rising demand for this useful metal and its manufactures.

In the department of the United States of America the Jury find but few objects belonging to their Class; those few, however, display energy, ingenuity, and the most perfect adaptation of the means to the end. They are mostly manufactures in iron, such as locks, cut nails, stoves, cooking apparatus, and other objects for ordinary use.

The Jury will now proceed to make such observations as they deem the purpose of their Report to require on certain branches of industry. For a detailed account of the contents of Class XXII. they must refer to the Descriptive and Illustrated Catalogue, already published; and it will be of course understood that the omission of any notice of specific manufactures by no means implies that those manufactures have been overlooked, but merely that the condition of them is satisfactory, or such as to call for no particular observation. In the list of the awards of the Prize Medal it has also been thought advisable to omit merely commendatory notices. The fact that a Medal has been awarded must be assumed as the highest commendation of the Jury; who have therefore contented themselves with a simple statement of the merit specially recognized in the award.

1. BRASS, COPPER, ZINC, AND TIN MANUFACTURES.

The brass-work of the United Kingdom is particularly distinguished for that beauty of workmanship which is generally characteristic of British wares. Excellence of material, solidity, brilliancy of polish, and flatness and equality of the "dead" or "frosted" portions, admirable fitting of the joints, and a certain appearance of thorough genuineness, are qualities pervading all the productions in this material exhibited by the manufacturers of Great Britain. These qualities appear to great advantage in certain branches of industry which admit of a moderate amount of ornamentation, in the shape of mouldings, twisted columns or

tubes, corner-pieces, perforated plates, and the like, which machinery can readily execute. In such cases, in addition to very perfect workmanship, there frequently appears considerable evidence of a feeling for harmony, and for a just proportion and arrangement of parts. Eminent examples of work of this character occur in the collection of brass-work (chiefly bedsteads), exhibited by WINFIELD (373), of Birmingham; and in the Mediæval Court, among the ecclesiastical brass furniture and utensils contributed by Messrs. HARDMAN (700), also of Birmingham, which are remarkable besides for the perfect intelligence with which the ornamentation (entirely Gothic) is designed and executed.

Brass-work of a character solely or chiefly ornamental can scarcely, however, be considered to be on the whole in a very advanced condition. There are numerous examples of excellence in nearly all branches of industry employing this material; but there is, perhaps, scarcely any collection which displays throughout, whatever may be the amount of ornamentation, a uniform good taste and intelligence in design. It has been said that the vulgar taste in which certain articles are designed and executed finds admirers for whose predilections it is the interest of the manufacturer to provide; but the Jury believe that, even admitting the existence of a vicious taste among consumers, and giving due weight to the motives of self-interest, which of necessity actuate producers, that policy is very short sighted, which, for the sake of a partial present advantage, sacrifices the general success of a branch of industry. They consider it very doubtful, besides, whether those who act on this view do not, in reality, underrate the tastes of those for whom they profess to provide. Instances illustrative of these observations will be found among the innumerable applications of brass-work to which the use of gas has given rise: such as fittings, brackets, pedestal-burners, chandeliers, table-lamps, &c., both for domestic use, for shops, and for public buildings, all of which are of excellent and substantial workmanship, but many marked by a vicious taste and the absence of artistic knowledge. Articles such as these being in common use, and constantly before the eyes, have a considerable influence on public taste, which it is accordingly in the power of manufacturers to guide to a larger extent than they seem willing to suppose.

These remarks scarcely apply to English brass-work struck from dies. The cornices, curtain-pins and bands, finger-plates, &c., prepared in this manner are intended for purchasers chiefly belonging to the cultivated classes; yet the specimens exhibited are almost uniformly better in execution than design. This is the more to be regretted, because the merit of work of this kind, supposing no defect in the metal, due precision in the impression, and a proper colour in the lacquer, depends entirely on the excellence and propriety of the design. A good design, in fact, can be as easily and cheaply executed as an inferior one; and although the Exhibition furnishes a few creditable specimens, this branch of manufacture will no doubt advance as knowledge of art and good taste are cultivated. It is necessary, however, to observe, that the specimens on the French side are not on the whole superior to those of British manufacture; and, possibly, sufficient attention has not yet been paid either in this country or abroad to the character of design, and the peculiar artistic effects which are compatible with the process of execution.

Bells and gongs coming to a certain extent under the description of Musical Instruments, the Jury considered it advisable to request the assistance of the

Sub-Jury A. of Class X., who obligingly communicated to them a Report on the merits of the various bells exhibited. This Report will be found in the Appendix (B).

The ornamental brass-work of French manufacture, which, besides being the largest contribution from any foreign country, enters most successfully into competition with home manufactures of the same kind, is generally remarkable for skilful and varied artistic treatment. It differs from the British rather in the uniform intelligence with which the ornamentation, whether little or much, is designed and executed, than in the absolute superiority of individual examples. The ornamentation is of every kind: ranging from profuse and heavy scroll-work to decoration in low relief; but there may be remarked, in particular, a taste for a peculiar treatment, which produces a richly-studded or jewelled effect with sharp, clear, and decisive shadows, approaching to the character of the work termed Elizabethan. The introduction of colour by means of jewels in paste, by enamelling, or by a difference of metal, is more frequently taken advantage of by French than by British manufacturers. By these aids, and the enrichment of surfaces by ornaments of a similar character, a picturesque and frequently brilliant effect is imparted. In careful finish, however, much is to be desired; the joints and fittings of separate portions being often so clumsy and unworkman-like as to create dissatisfaction on a near examination. This deficiency may be exemplified by a comparison of the ecclesiastical brass-work exhibited by POUSSIELGUE-RUSAND (France, 1405), with articles of a similar character in the collection furnished by Messrs. HARDMAN, of Birmingham, in the Mediæval Court. In this instance, besides, the French productions display far less intelligence in design than the English: the former being imbued to a considerable extent with the peculiar character proverbially, though now improperly, assigned to Birmingham work; while the latter is entirely devoid of it.

French bronzes and small ornaments of mixed materials, *pendules*, dishes, and vases for flowers, &c., are exhibited in great profusion, and on the whole merit high commendation. The spirit, fancy, and invention they display are unbounded. Here again the remark is applicable, that single examples on the British side, for instance, from the collections of J. A. HATFIELD, of POTTS, of MESSENGER, and of THE COALBROOK DALE COMPANY, may be placed side by side with many of the French specimens with no disadvantage to the former; but that on the whole the French manufactures of this kind deserve the pre-eminence. It may be doubted, however, whether in point of purity of taste, this praise which the Jury willingly accord does not require some qualification. They find in the bronzes of Prussian, German, and Italian manufacture, a purity of form and a uniform carefulness of design and finish, which they consider well worthy of observation; and which, on a comparison with French works of the same kind, give them an advantage over the latter in these respects. The questionable taste, in particular, in which many French *pendules* are designed, is scarcely compensated for by the obvious dexterity of the modelling and chasing.

The examples of zinc manufactures, castings, and galvano-plastic productions are more numerous from France, Belgium, and the States of the Zollverein, than from Britain. In this country the use of this metal has hitherto been chiefly confined to the manufacture of household utensils and conveniences, such as baths,

and vessels for culinary and other purposes, for alloys, galvanizing, and coating other metals, and as a substitute for lead in the roofing of houses, &c. On the continent, in addition to the application of zinc to purposes of utility (which is carried on to the same, perhaps to a larger extent), the metal has also within the last few years been pretty extensively employed as a substitute for bronze in casting statues and other objects of art, both on a large and small scale. For this purpose it appears to offer considerable advantages; though it may be doubted whether experience of its use is as yet sufficient to warrant a very decided judgment. The effect, however, of these castings, whether with a surface of zinc or with another metallic coating, is in general good; and at all events, the cheapness and comparative lightness of the metal seem to be in its favour as a means of forming cheap duplicates of objects of high art existing in the more costly materials of bronze or marble. The specimens exhibited by GEISS, and DEVARANNE and SON, of Berlin, by MADAME DE BRAUX D'ANGLURE, and by the BELGIAN SOCIÉTÉ DE LA VIEILLE MONTAGNE, are the most noticeable. The latter in particular have most fully and successfully exemplified the various uses to which zinc may be applied; and the specimens exhibited are calculated to afford useful hints to the manufacturers of the United Kingdom. The use of zinc for preventing the oxidation of iron, its aptness for perforation, and its general application to domestic purposes, are already recognised in this country; but it is obvious that on many accounts it may be advantageously employed to a larger extent, especially in cases where the unyielding character of iron, and the high cost of copper, present obstacles to their use. The Jury believe that zinc has been scarcely, if at all, resorted to in this country for statuary and the casting of small groups of figures and ornaments.

In copper, zinc, and general hardware, the exhibitors are on the whole not numerous. On the French side, MESSRS. ESTIVANT BROTHERS afford examples of brass caldrons of extraordinary excellence of workmanship; and from Belgium a nest of brass pans are sent in an unfinished state, which, however, favourably indicate the condition of that kind of industry. The coffee and tea-urns and kettles of this country present no striking improvement in form or in other respects; and the copper culinary utensils, although well executed, appear to be giving way to vessels of iron, which, owing to its cheapness and the recent improvements which have been made in tinning and enamelling, is likely to supersede the use of copper for these purposes: the objections formerly made to it on account of its weight and the risk of fracture, having been removed by the substitution of sheet for cast iron.

2. IRON AND STEEL MANUFACTURES, IRONMONGERY, &c.

The iron manufacture of the United Kingdom may justly claim a very high place. The advantages afforded by a material so cheap and abundant are indicated by the vast extent and variety of its uses; and it may be safely affirmed that no branch of industry, employing iron, need ever languish on account of any scarcity, dearth, or uncertainty in the supply of this important metal.

The whole collection of steel and iron grates, fenders, and fire-places, kitchen ranges, stoves, and apparatus for warming and ventilation, is considered by the Jury to constitute a most interesting, and on the whole, a highly creditable and

satisfactory exhibition of the state of those branches of industry in the United Kingdom. In that portion of it which includes tasteful design as an element of merit, the Jury regret to find instances in which a deficiency in that respect is but too apparent; but, on the whole, they are disposed to consider the manufacture of ornamental drawing-room and other grates and fenders, and decorated stoves, to be in a most promising condition in respect to taste. The grates of Messrs. HOOLE, ROBSON, and HOOLE, of Sheffield, executed from designs by Mr. ALFRED STEVENS, and those exhibited by Messrs. STUART and SMITH, of the same place, may be adduced as evidence of remarkable advancement in tasteful design. The former display great beauty and artistic intelligence; while the latter, in some instances less eminent in those respects, are remarkable for general brilliancy of effect, great precision and excellence of workmanship, and certain novel applications of ornament. The Jury wish to notice, with special approbation, those portions in the grates of Messrs. Hoole, Robson, and Hoole, in which the castings remain in the state in which they leave the mould.

The progress of this manufacture in all respects, is the more remarkable, considering the absence of foreign competition, and the comparatively short time that has elapsed since it began to assume its present highly-decorative character. It is only since the end of the last or the beginning of the present century, that this branch of industry was introduced into Sheffield. Previously to that time, it had been carried on in London and Edinburgh; and grates or fenders of an ornamental description still continued to be manufactured in those places for the first twenty years of the present century, about the end of which period, manufacturers began to establish themselves in various parts of the country. These, by employing greater artistic talent, became successful competitors with the London houses, whose trade from that time continued to decline, and Sheffield became the principal seat of manufacture for the better and more ornate sort of stove-grates and fenders. Of this sort some few still continue to be manufactured in London; but the London market is now, for the most part, supplied by the works in the town of Sheffield.

The trade in the commoner description of grates is more extensive, and is principally carried on by the Carron Company and other foundries in Scotland, by the Coalbrook Dale Company, and foundries in Northampton, Dudley, Rotherham, Birmingham, Mansfield, Nottingham, and Derby.

The Jury think it deserving of notice with respect to this branch of industry, that in all the communications which have been made to them by the persons engaged in it, they find observations commendatory of the School of Design in Sheffield, and expressive of the high sense they entertain of the services it has rendered to ornamental art, and in particular, to the manufactures of that place.

The articles of this description exhibited by continental manufacturers are few in number, being chiefly stoves; amongst which the grate contributed by ANDRÉ (France, 1053), and calorifères in brass and cast iron, by LAURY (France, 563), are the most deserving of notice.

From the United Kingdom, examples of the ordinary kitchen range are numerous, and uniformly characterized by a sound and substantial workmanship. On the actual working merits of the various contrivances and arrangements displayed by them, the Jury do not feel themselves qualified to form a very

decided opinion. They would, however, observe generally, that in many cases, the massiveness, extent, and heavy character of the iron-work appear to be carried to excess, and a wider space sometimes assigned for fuel than is necessary, or consistent with economy. It is doubtless very desirable to give such a degree of strength to a kitchen range as shall insure it in all its parts against injury from fracture, which is in most cases difficult to repair; and hence, economy of material is not to be regarded as a primary consideration; but the difference between the large extent and massiveness of some ranges, and smallness and chest-like appearance of others is so extreme, while the professed and possibly the real capabilities are about equal, that it is evident we have not yet arrived at very distinct conclusions respecting the exact adaptation of the means to the end in this branch of industry. Much of the variety in size, and as a consequence of this, in arrangement, is no doubt due to the necessity of providing for the different sizes of kitchens and fire-places; a necessity which must, on the whole, tend also to maintain high prices. It must be admitted, besides, that obstacles to improvement and the speedy adoption and testing of new contrivances arise out of the arrangements current in England between landlord and tenant. A kitchen range comes under the description of what are termed "landlord's fixtures," and in many, perhaps the majority of cases, has been selected more on the ground of economy in the first outlay than with any view to the excellence of the contrivance or the permanent comfort and convenience of the occupant, who, though dissatisfied, finds it difficult on several accounts to disturb the agreement he has come under.

In Scotland, grates are the property of the occupant, but it is doubtful whether this circumstance contributes on the whole to improvement. A large majority of tenants are more able to pay annually a small addition to their rent as interest for the outlay of the landlord on grates, than to incur that outlay themselves; and hence, with such persons, economy outweighs all other considerations.

Taking all the circumstances into account, the Jury think that the attention of our kitchen-range manufacturers might be advantageously directed to the production of one which, compact, moderate in size, economical in fuel, and answering all the ends of convenience that must be provided for in the majority of cases, might be sold at a low price. They are unwilling, as has been remarked, to offer any decided opinion on the comparative merits of the ranges submitted to them, more especially as those merits are so generally uniform; but if they were to make a difference, they would say that the kitchen range of J. FLAVEL of Leamington, Warwickshire (38), for appearance of workmanship, economy of fuel, and its combination of the stove and open fire, seems deserving of special notice. The cooking stove of EVANS and SON (103) exhibits a somewhat novel, but not unsuccessful attempt to apply to that kind of manufacture a moderate amount of appropriate ornamentation.

The Jury observe with regret that there is no cooking stove or apparatus of first-rate manufacture or extent exhibited among the productions of the Continent. Foreign hotels and large establishments must be furnished with such; and it certainly would have been both interesting and instructive to our manufacturers, to have been able to examine the contrivances by which cooking on a large scale is conducted in countries remarkable for their culinary skill.

The contrivances recently invented for cooking and heating by gas, of which a

considerable number are exhibited on the British side, appear to be well made and constructed; but the Jury are unable to pronounce any united opinion on their efficiency. The chief advantage professed by them is economy; and there seems to be no reason to doubt the justness of their claim to that advantage, if other more necessary conditions are complied with; but it would appear that as yet, more unquestionable success has attended the application of gas to warming apartments, than to cooking, or heating water for baths. It would, however, be unreasonable to expect the entirely successful application of a new *calorific* power, with an experience so limited as we now possess of the conditions under which it may be rendered available; and the Jury accordingly refer to these contrivances less for their present completeness and efficiency than for their probable future importance, which, some of its members believe, can hardly be over-estimated.

Casting in iron forms a large and important branch of industry wherever the advantages of iron and fuel are possessed to an adequate extent. Owing to the variety of coal-fields, abundance of the mineral, and improved modes of smelting, England is distinguished above other nations for the exuberance and cheapness of her supply of iron, and for the extent to which it is employed in casting. If, however, the quality of articles produced by casting be considered, the contributions from France, Belgium, Prussia, and Austria, will show that she has powerful rivals to contend with in that respect. The iron castings from these countries display a sharpness, cleanness, and closeness of texture, and a good taste and intelligence in design, which afford much reason to doubt whether any pre-eminence can be accorded to this country, except so far as mere quantity is concerned. It is, of course, not to be forgotten, that the comparison can only be made within certain limits. The iron castings of this country, if they do not actually take a wider range than the continental, do so in the Exhibition; but still if the comparison be confined to objects of a similar character, the Jury believe that the palm of superiority must be assigned to the continental specimens, which, on the whole, are distinguished more highly for skilful casting and intelligent and appropriate design. Among the most eminent in these respects they rank the cast-iron bedstead of J. P. V. ANDRÉ (France, 1053), which is exhibited in the state in which it comes from the mould, as a pure casting to which the file has not been subsequently applied. The founder, in this instance, has succeeded either by attention to the quality of the sand, or to the temperature of the metal, in producing impressions of the most beautiful distinctness. Some of the castings of MOREL (France, 1666) have also much elegance and lightness. It may be added that the railings, and generally the iron castings exhibited on the French side, are light and graceful in appearance; and the Jury believe it extremely probable, that if the iron founders of France, with their facilities for obtaining tasteful designs, enjoyed the advantage of a larger supply of cheap material—either by improvements on their mode of smelting, or by the removal of impolitic restrictions on the importation of foreign iron—they might, besides greatly increasing the demand at home, become successful exporters to this country, where ornamental castings of really excellent design and low price are by no means largely supplied.

THE ROYAL PRUSSIAN IRON FOUNDRY also exhibits specimens of iron casting of

a very high order. The minute and delicate castings, consisting of trinkets, small chinnoy ornaments, and figures, executed at Berlin by private enterprise, are already favourably known in this country. They are, it is said, the produce of small furnaces, from which by great care in the choice of iron and other precautions, the founders are enabled to obtain the metal in a degree of fluidity necessary to fill the minute and sometimes intricate moulds employed. The more important works contributed by the Royal Prussian Iron Foundry sustain the reputation of Berlin iron casting. In particular, the Jury notice with approbation two cast-iron pedestals with figures and scrolls in high relief, surmounted by equestrian statuettes; works which they consider most spirited and beautifully cast.

A bust of the king of Spain, cast at the ROYAL ORDNANCE of TRUBIA, may also be noticed on account of the delicacy and precision of the impression (Spain, 280); and for the same reason, busts of the king and late queen of the Belgians, by the firm of VAN DER BRANDEN and Co., of Brussels (Belgium, 363).

The iron casting of the United Kingdom, though already, as has been observed, of great extent, might doubtless be more largely employed for purposes both of use and ornament. It is probable that the expense of new moulds, the difficulty of obtaining appropriate designs, and a prejudice existing against iron on account of its liability to fracture and oxidation (though the latter fault may possibly be obviated), present in many cases obstacles to its more extensive use in construction and decoration. That it is susceptible, in casting, of the most perfect and sharp impressions, is clearly evinced by the examples already noticed; and the successful rendering of Mr. J. BELL's statue of "the Eagle Slayer," by the COALBROOK DALE COMPANY, shows that the cost of many public monuments might be reduced by bringing into use, as a substitute for bronze, a material cheaper than zinc, and more easily procured in this country. On the whole, and considering the comparative merits of British and foreign iron casting with respect both to execution and design, the inferiority of the former may be said, as in other cases to be general, and on an *average* rather than special. There are examples from the United Kingdom which, in all respects, may challenge comparison with the productions of any country; but the average merit of British iron castings of an ornamental kind is lower than that of France or Prussia; and it will probably be found that the pre-eminence of those countries is due rather to the employment of better artists for the preparation of designs, and artisans more intelligent in design, than to any superiority in the mere process of casting. In other respects, some of the continental nations labour under disadvantages which do not affect the United Kingdom; and if our iron castings are in any respect inferior, the blame rests with our founders who neglect to avail themselves of all the means necessary to the perfection of their art.

In the manufacture of locks, Wolverhampton still sustains its ancient reputation. Excellence of workmanship, lowness of price, and an adequate degree of security, characterise the contributions from that place, and prove the advantage of the peculiar division of labour which is adopted in the manufacture. The specimens of locks throughout the Exhibition generally evince that the art is in a very advanced state, both here and on the Continent; but still it is impossible for the Jury to ignore the fact, that the present condition of lock-making is traceable to English ingenuity and invention; and they believe that on the whole the

collection of locks on the British side deserve the place of pre-eminence. The lock on the very well-made safe of SOMMERMEYER, of Magdebourg, may be noticed honourably; and the bank lock of Messrs. DAY and NEWELL, of New York, is remarkable for ingenuity of principle, and for combinations and arrangements which seem to render it impregnable. Locks of this description, if they could be sold at a moderate price and made available for ordinary purposes, would no doubt be favourably received, and remunerate the inventor. It is, however, a serious objection to any lock, notwithstanding its ingenuity and security, that the key should be so ponderous and hulky as to require for itself a separate place of deposit and safe keeping. The smallness of the key in proportion to the size and strength of the lock is particularly remarkable in the locks of Messrs. BRAMAH and of Messrs. CHUBB, besides those merits in other respects, which public opinion has so long and so amply recognised.

On the comparative security afforded by the various locks which have come before the Jury, they are not prepared to offer an opinion. They would merely express a doubt whether the circumstance that a lock has been picked under conditions which ordinarily could scarcely ever, if at all, be obtained, can be assumed as a test of its insecurity.

In connection with locks, the Jury may refer to iron safes and treasure-chests, of which a large number is exhibited, and which for the most part are of about equal merit, so far as the chances of security offered by them are concerned. It seems doubtful whether much of the ornamentation and expensive polished work which some of them display might not be dispensed with. Any addition of that description to the expense, necessarily considerable, of a safe or treasure-box seems quite gratuitous, more especially since it has become usual, and is considered most secure, in large banking and other establishments, to preserve safes in fire-proof rooms or vaults, into which they are lowered at the close of business.

The locks and general ironmongery of France are inferior in many respects to the productions of the same kind from other continental nations. There appears to be a desire to extend manufactures in metal, but it is rendered powerless by the restrictions imposed on the importation of the raw material into France. It is impossible under present circumstances, for the manufacturer to reduce the price of his productions to such an extent as to afford him adequate remuneration. Since 1844, the manufacture of iron-tin plates and steel has been more than doubled in the United Kingdom. This, on the one hand, has reduced the price of the raw material, and, on the other, has stimulated those engaged in working it up to supply their goods at a cheaper rate, and to find new markets. This branch of industry, accordingly, with us presents a healthy and growing appearance which contrasts strongly with the stunted condition which seems to characterise the corresponding manufactures of France. On the stall of JAPY BROTHERS (France, 275) the Jury find several articles of tin-ware manufactured from the most expensive charcoal iron, in a mode that so far economizes labour, as to overcome the formidable expense of the material:—machinery enabling them to sell a saucepan for 6d. which is made from charcoal iron at 30*l.* per ton. But in other cases, they are obliged to use the same costly iron without the facilities afforded by machinery, and the consequence is, that prices are too high to insure a large consumption, and industry stagnates.

The enamelled ware of Paris, and the coating of tin by the new process of BOUCHER (France, 776), both appear to be deserving of notice. The process by which the former is produced has been employed in this country by the Birmingham Patent Lap-welded Tube Company, who find it extremely valuable as a preservative of their tubes from the action of water in locomotive boilers; iron tubes being variously affected by the different qualities of the water used. The process is also largely employed in Austria and the Zollverein States.

The ironmongery trade of Germany and the States of the Zollverein exhibits far greater activity. The contributions from Iserlohn, Hagen, Barmen, and other places in Westphalia, indicate the existence of a large and profitable industry; and the difference between the price of steel and iron goods in these countries and Birmingham is not so great as to affect its growth and strength. To all parts of the world, and even largely to England, common articles for *sale* rather than *use* are exported, and are vended by hawkers and pedlars through this country. The higher cost of the raw material in Westphalia is compensated for by the cheapness of labour, and the manufacture being an ancient, not a modern one—Westphalia having for centuries been celebrated for ironmongery and tin goods—the common wares sent to this country are sold at very low prices. On weighty articles of iron, however, such as anvils, vices, and heavy tools, the difference of price between Sheffield or Birmingham and Hagen, is about the amount per cwt. of the duty on iron; and such articles as these are accordingly precluded from competition with the British of the same description in foreign markets.

A new use of sheet-iron, prepared by a coating which imparts to it a surface that takes freely the mark of a slate-pencil, is exhibited from Wurtemberg. It is much lighter, and much less liable to injury than common slate, and appears to be a clever adaptation of iron to an every-day purpose. Along with this may be noticed a singular illustration of the pliability of sheet-iron exhibited by T. L. PALMER (France, 942). It is a quart bottle, very perfect and without seam, such as might be employed with advantage for the conveyance of mercury, instead of the heavy cast-iron bottles now used for that purpose.

Among the manufactures of iron sent from the Continent none are more remarkable than the hand-made nails of Belgium. This branch of industry in Belgium is of very large extent,—no less than from 8,000 to 9,000 tons being exported annually, principally of the small sizes called “Flemish tacks.”

Belgium approaches more nearly than any other country to the United Kingdom in the quantity and price of its iron; the difference in favour of the latter averaging about 20s. per ton on the principal sorts of iron. It is worthy of notice, however, that the price of “nail-rods,” the kind used in the manufacture of nails, is lower in Belgium than in England; a fact which seems to indicate that a constant and regular demand for one description of iron will not only insure its supply but diminish its cost, possibly by the inducement held out to the exercise of ingenuity on the means of economising the cost of production.

The sorted samples of hand-made nails exhibited by the SOCIÉTÉ ANONYME DE COUILLET (Belgium, 120) were considered by the Jury to be so excellent in every respect that they were desirous of according to that Society the highest mark of commendation in their power; but they were prevented from doing so from the circumstance that M. F. Spitaels, President of the Société de Couillet, is also

one of their members, and on that account precluded from entering into competition.

The hand-made nails of Austria, which do not appear to be exported to any extent, are also of excellent quality, and remarkable for a peculiar twist given to the shank of the nail, which is said greatly to increase its tenacity. For railway spikes this twist has been in use, though not generally, in the United Kingdom; but its application to the small sizes, including those termed "points de Paris," is shown only in the samples from Austria. Of these the productions of the establishment belonging to COUNT DUBSKY deserve particular notice.

The machine-made nails of the United States must also be referred to. This trade is of very great importance: at the least from 35,000 to 40,000 tons being manufactured annually. For this and other purposes, such as ship-building, boiler-making, &c., large quantities of cheap iron are imported from Great Britain, which, owing to the wide extent of American sea-board, can be supplied to most of the southern states of the Union at a cheaper rate than would be the case even were the prices in Pennsylvania and in Great Britain the same at the works.

With respect to articles of a miscellaneous description, the Jury must refer to the explanatory Catalogues already published. They would merely observe that, on the evidence furnished by the Exhibition, there can be no doubt that the hardware manufactures of the United Kingdom are alone co-extensive with the wants, the comfort, and the conveniences of civilized life. In some countries refinement and taste are more amply provided for; but at a comparative sacrifice of the interests of the many. In other countries particular branches of industry of a useful and ornamental, and sometimes of a useless though profitable kind are cultivated to a considerable extent; others appear to be entirely devoid of any industry but such as either supplies the mere necessities of life, or ministers to the artificial and expensive wants of an aristocracy. In the United Kingdom alone industry has no exclusive bearing. Cheapness and abundance for the many are as much its rule, as splendour and costliness for the few. It alone exhibits an effort to meet every possible demand which taste, refinement, comfort, convenience, economy, or necessity can make upon it. The extent to which that effort has been successful, in certain directions, admits of question; but that the effort has been, and continues with untiring energy to be, made, is beyond all doubt.

The following are the awards which have been made by the Jury:—

I. THE COUNCIL MEDAL

1. **ANDRÉ, J. P. V.** (France, 1053).—The high excellence of the castings by André has already been noticed. The end of a bedstead in cast-iron is considered by the Jury to be one of the most faultless castings in iron contributed to the Exhibition. The design is in good taste, and the sharpness and soundness of the casting extremely perfect. A cast-iron fountain in the East Nave is also a meritorious work; though it may be doubted whether cast-iron is a material suitable for such a purpose, unless protected from the action of water by some hydrofuge.

2. AUBANEL (France, 1055).—This exhibitor has given the highest evidence of his skill, in a group of an Eagle and Lamb, a bronze gilt chimney-piece, and a gilded cast-iron door. The latter is extremely well designed and beautiful in execution. These, and the above-mentioned works of André, evince with equal success the applicability of cast-iron to artistic uses.

3. BARBEDIENNE et Co. (France, 1709, 1723).—This firm exhibits a magnificent collection of artistic works in bronze, consisting for the most part of reductions by mechanical processes from ancient and modern works of sculpture. The processes are the invention of Collas, the bronzes finished by the sculptor Clesinger. The Jury consider that the whole collection displays a carefulness, completeness, and beauty of execution which place it in the first rank (Joint Medal with Class XXVI.)

4. THE COALBROOK DALE COMPANY (641).—The vast extent of the contributions by this Company, their variety and very general excellence, whether as objects of utility or ornament, seem to claim for them a very prominent place in the awards of the Jury.

This Company, one of the oldest in Great Britain, carries on the largest manufacture of iron and iron trade in the world; the works producing the almost incredible amount of 2,000 tons of finished iron per week.

On a small scale, iron-works seem to have existed in Coalbrook Dale from a remote period, but the records only extend to the reign of Charles II.

The works of the present proprietors date from the beginning of the last century, since which time they have gradually attained their present magnitude. In the earlier half of the last century the first iron railroad for waggons ever known in England, was laid down at these works; and its efficiency being proved, the furnaces at the top of the Dale were connected by railway with the foundry at the centre, and the line continued from thence to the stores and wharf on the Severn; from which the products of Coalbrook Dale still continue to be sent down the river in barges for export to their several destinations.

In 1779, the Company had the merit of erecting the first iron bridge ever constructed in England, viz, that over the Severn, near Madeley; the position of which was so advantageously chosen that a populous and thriving market town arose in the neighbourhood, and now bears the name of Ironbridge.

The Company is besides remarkable for the introduction of improved modes of smelting, and economy in the manufacture of iron.

The products of the Coalbrook Dale Works, now of all descriptions, were, until about twelve years ago, chiefly confined to the manufacture of bar iron, beams, pipes, castings for bridge-work, agricultural implements, and the hollow ware, consisting of culinary utensils, brewing vessels, sugar pans, &c. for which Coalbrook Dale originally obtained its celebrity. Since that period, the attention of the Company has been directed to the production of ornamental castings; and the success which has seconded their efforts is fully exemplified in their numerous contributions to the Exhibition. There is, perhaps, no establishment in which so many different kinds of labour are applied:—its operations extending from the first raising and smelting of the ore to the ornamenting and burnishing of highly-finished works in iron and steel.

5. J. HARDMAN and Co. (700).—Such of the productions contributed by this firm as belong to Class XXII. are admirable in workmanship, and unrivalled for perfect development of the mediæval design and taste in which they are executed. The designs have been for the most part, it is understood, prepared by Mr. A. W. Pugin, and reflect great credit on that gentleman; but the Jury are more particularly impressed with the very perfect manner in which Messrs. Hardman have developed the artist's conceptions. It evinces a skill in manipulation which might, they conceive, be exhibited to still greater advantage in brass work of a more varied and ornate style than may be admissible in the particular species of mediæval art to which they have confined themselves.

6. HOOLE, ROBSON, and HOOLE (140).—The beautiful grates, fireplaces, and fenders contributed by this firm have already been noticed. They are designed chiefly in the Italian taste of the earlier half of the sixteenth century, and display a subserviency of the execution to the intentions of the artist, to a degree which places them among the most remarkable contributions from the United Kingdom. The castings on some of these grates have been before alluded to; and it may be added here that there are, besides, some detached specimens shown as they come from the sand, which appear to be quite faultless. On the whole, these works are distinguished for a higher and purer taste, and the application of a more artistic ornamentation, than productions of a similar kind have yet exhibited.

7. C. S. MATIFAT (France, 923).—The Jury consider the contributions by this exhibitor to be of a very high order. They are chiefly works in bronze, and bronze gilt and silvered, consisting of chandeliers, candelabra, candlesticks, stands for gold-fish and for flowers, and various caskets, and chimney and table ornaments; which, for the most part, are designed in good taste and admirable in execution. The chasing, chiselling, and finishing of these works, the Jury believe to be without parallel in their Class. In that respect they would advert more particularly to the stand or fountain for gold-fish, a small bronze of a lion and lamb, a casket in bronze and hard-wood, and a lofty candelabrum in bronze. They may also mention (though it can scarcely be reckoned in Class XXII.) an unfinished *pendule* in ivory and bronze gilt, designed by DIETERLE, with figures sculptured by several artists from a model in plaster by SCHOENWERK. It is a work of great beauty.

8. FERD. MILLER (Bavaria, 90).—The beraldic lion cast in bronze by Miller, of Munich, from the model by Professor Halbig, is regarded by the Jury as a most admirable example of successful casting.

It is said to be one of a pair cast at the same time from the same furnace, and to weigh about six tons. Ample details of the history of this work are already before the public. It may be sufficient, therefore, to notice, that the difficulties of casting in bronze, in this instance so successfully overcome, become greater in proportion to the size of the mould to be filled. The liability of the metal to "blow," the precautions necessary to obviate a change in the character of the alloy which takes place owing to the rapid oxidation of the tin, to secure the perfectly-uniform dryness of the mould, and to preserve the mass of molten metal at the high temperature required—are difficulties which it is scarcely possible to over-estimate in a case like this; and the Jury are persuaded that public opinion

will justify the high place which they assign to this work as a specimen of bronze casting.

9. The ROYAL PRUSSIAN IRON FOUNDRY, at Berlin (Prussia, 271), has been already adverted to.

10. SOCIÉTÉ DE MINES ET FONDERIES DE ZINC DE LA VIEILLE MONTAGNE (Belgium, 26) has already been mentioned with high commendation.

11. STUART and SMITH (102). The Jury have had occasion, in a previous part of this Report, to remark the peculiar beauty of workmanship and general brilliancy of effect for which the contributions of this firm are distinguished. In this respect they stand pre-eminent; and it deserves also to be noticed that this house has, perhaps, more than any other contributed to impart the highly-ornate character which the stove-grate manufacture possesses at the present time. The grates exhibited by them are for the most part manufactured on "Sylvester's plan;" by which the combustion of the fuel takes place on a metal plate which extends into the room and lies on the surface of the floor. In proportion as custom deviated from the primitive practice of making the fire upon the hearth, it lessened the comfort arising from a proper distribution of heat. When grates were placed so high as has until very recently been customary, the greater part of the heat evolved passed up the chimney, leaving the lower stratum of air (the coldest part of a room) in contact with the legs and feet. This is obviated by Sylvester's plan, which, besides, affords the advantages of greater cleanliness, and the facility with which the same grate can be adapted to burn either wood or coal. The metal plate on which the fire is made, extending as it does from the fire-place to the fender, admits of being highly ornamented: and Messrs. Stuart and Smith have shown how skilfully they are able to take advantage of its capabilities in that respect.

The Jury have only to add with regard to this award and No. 6, that the fact of their having recommended the award of Council Medals to two exhibitors of articles in the same branch of manufacture, must be assumed as evidence of a well-considered opinion that both exhibitors have pre-eminently distinguished themselves, though by the development of different qualities of beauty and excellence in their several productions.

12. R. W. WINFIELD (373).—Reference has already been made to the collection of brass-work contributed by this exhibitor, as displaying very perfect workmanship with a moderate amount of ornamentation; particularly in the manufacture of metallic bedsteads, for which he has earned a deservedly-high reputation. His improvement in the construction of these by means of a continuous post which obviates unsteadiness and loosening of the joints, is deserving of attention, as well as the twisted, spiral, and plain-tapered pillars or tubes employed for that and other purposes, which are produced in a peculiarly ingenious manner, invented by one of the workmen of the establishment.

This house has also had the merit of introducing the combination of plain opal or coloured glass with brass-work, by which flowers, blossoms, buds, or leaves in glass, are made subservient to purposes both of utility and ornament, in the manufacture of cornice-pole ends, curtain holders, door-handles, &c.

II. THE PRIZE MEDAL.

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
United Kingdom -	265	Abate, F. - - -	Specimens of a new art termed Metallography.
United States -	462	Adams and Co. - -	Bank lock.
United Kingdom -	300	Allen and Moore - -	Metal buttons.
—	150	Armitage, M. and H.	Anvils, &c.
Prussia - - -	189	Arnhelm, S. J. - -	Iron safe bureau.
United States -	138	Arrowsmith, G. A. -	Permutation locks.
United Kingdom -	283	Aston, W. - - -	Buttons.
—	663	Aubin, C. - - -	Locks.
—	805	Baily and Sons - -	Cast-iron staircase work, brass-work, &c.
—	319	Baker and Co. - -	Flower-stand and cages.
—	287	Banks, E. - - -	Buttons.
—	34	Barnard and Bishop -	Wrought-iron hinge.
—	695	Barron and Son - -	Locks.
—	329	Bartlett and Sons - -	Needles and fish-hooks.
—	25	Bartrum and Pretynian -	Wrought copper nails, &c.
—	361	Bedington and Tonks -	Brass-work (various).
Prussia - - -	407	Beissel's Widow, and Son	Needles of English steel.
United Kingdom -	98	Benham and Sons - -	Cooking apparatus.
—	606	Bentley, W. H. - -	Cooking apparatus.
Prussia - - -	310	Blaeser, G. - - -	Bronze statue of Beethoven, &c.
France - - -	28	Blaazy, Poure, and Co. -	Metallic pens.
United Kingdom -	349	Blews and Son - - -	Ship lamps and bells.
Prussia - - -	633	Baker, R. and H. - -	Hardware, various.
United Kingdom -	353	Bolton, T. - - -	Brass and copper tubes.
—	680	Boschbyer, J. H. - -	Locks.
France - - -	776	Boucher, E., and Co. -	Culinary vases, tinned by a new process.
United Kingdom -	330	Boulton and Son - -	Needles and fish-hooks.
—	653	Bramah and Co. - -	Locks and castings (and Special Approbation).
France - - -	437	Bricard and Gauthier -	Locksmith's work, &c.
United Kingdom -	458	Bright, R. - - -	Carriage lamps.
—	364	Brisband, H. - - -	Buttons.
—	477	Brown and Redpath -	Stoves for ships.
—	633	Burney and Bellamy -	Tanks for oil, water, &c.
France - - -	1129	Cain, J. - - -	Bronzes,—birds in nest, &c.
United Kingdom -	655	Carpenter and Tildesley -	Locks.
—	459	Childs, J. - - -	Brass lamp for lighthouses.
United States -	417	Chilson, Richardson, & Co.	Hot-air furnace.
Russia - - -	365	Chopin, Felix - - -	Bronze candelabrum.
United Kingdom -	646	Chubb and Son - - -	Locks and safes (and Special Approbation).
—	446	Clarke and Restell - -	Lamps, gas-burners, and locks.
—	657	Clarke, T. and C., and Co.	Enamel ware.
—	434	Cochrane, J. - - -	Gas-meter.
—	115	Cocker, S., and Sons -	Needles.
—	234	Cocker and Sons - -	Needles.
—	27	Coombe and Co. - -	Iron and copper netting.
—	255	Cope and Collinson -	Brass-work, various.
—	416	Corcoran, B., and Co. (CL VI.)	Metallic cloth.
United States -	46	Cornelius and Co. - -	Chandeliers.
United Kingdom -	698	Cottam and Hallen - -	Gates, cast-iron, and enamelled cast-iron horse-manger.
—	307	Cotterill, Edwin - -	Locks.
—	63	Cottingham, N. J. (Main Avenue West).	Brass lectern.
—	62	Cowley and James - -	Beds and steam tubes.
—	244	Crook, W. - - -	Cooking apparatus.

PRIZE MEDAL—continued.

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
United States - -	208	Day and Newell - -	Parautoptic permutating locks (and Special Appropriation).
United Kingdom -	186	Deane, Dray, and Deane	Stove grates.
Belgium - - -	361	De Bavay, Paul - -	Pointes de Paris nails, &c.
France - - -	779	De Braux d'Anglure -	Statues of galvanized zinc, bronze busts, &c.
Wurtemberg - -	71	Deffner, C. - - -	Hardware, various.
United Kingdom -	482	Defries, N. - - -	Gas-meter, bath heated by gas, &c.
Belgium - - -	800	De la Fons, J. P. -	Locks.
France - - -	363	De Latour, Albert -	Iron castings.
Spain - - -	260	De Miguel, F. - -	Iron bedsteads, &c. (and Special Appropriation).
Belgium - - -	365	De Rosée, Baron A. -	Brass caulkrons, &c.
France - - -	1588	Desjardins-Lieux - -	Medallions, &c.
Prussia - - -	280	Devaranne and Son -	Castings in zinc.
France - - -	188	Dietrich and Son - -	Specimens of iron castings, &c.
United Kingdom -	797	Dixon, J., and Son -	Powder flasks.
Prussia - - -	476	Dowson, J. E. - - -	Candy's hot-air ventilating stove.
Belgium - - -	639	Dreys and Collenbusch	Copper rivets.
Austria - - -	353	Drion, E. - - -	Wrought nails.
United Kingdom -	456	Dubsky, Count - - -	Wire tacks, twisted nails.
Prussia - - -	350	Dugard, N. and H. -	Carriage lamps.
United Kingdom -	89	Duley, J. - - -	Cottage cooking-stove.
Prussia - - -	336	Edelesten and Williams	Pins.
United Kingdom -	61	Edge, J. - - -	Pit chains.
Prussia - - -	441	Edge, T. - - -	Gas-meter.
United Kingdom -	387	Edwards, F. - - -	Arnott's stove.
Prussia - - -	200	Egells, F. A. - - -	Cast-iron chimney-piece.
Austria - - -	435	Egger, J. B. - - -	Lead pipe, 1800 feet long, in one piece.
Prussia - - -	702	Einsiedel, Count G. -	Cast-iron goods, &c.
United Kingdom -	302	Elliott and Son - -	Buttons.
Prussia - - -	103	Evans, J., Son, & Co. -	Cooking apparatus.
United Kingdom -	352	Everitt and Son - -	Brass and copper tubes.
Belgium - - -	154	Falisse and Trupmann	Percussion caps.
United Kingdom -	444	Faraday and Son - -	Gas chandelier on Professor Faraday's principle.
United Kingdom -	686	Feetham, Miller, and Sayer	Stove grates, &c. (and Special Appropriation).
Prussia - - -	161	Firmin and Sons (Cl. xx.)	Buttons.
Austria - - -	420	Fischer, A. - - -	Malleable cast iron.
Prussia - - -	296	Fischer, C. H. - - -	Figures in bronze, &c.
United Kingdom -	38	Flavel, S. - - -	Cooking apparatus (and Special Appropriation).
France - - -	1227	Fontaine, P. - - -	Brass pans.
Prussia - - -	293	Franz, J. - - -	Bronze figures of Victory, &c.
Prussia - - -	289	Friebel, L. - - -	Bronze Newfoundland dog, &c.
Austria - - -	412	Fürstenberg, Prince -	Stoves, monuments, crucifix.
France - - -	227	Gagneau Brothers - -	Lamps, bronzes, &c.
United Kingdom -	556	Gardener, M. - - -	Chandelier.
Prussia - - -	483	Garton and Jarvis -	Stoves.
Austria - - -	703	Gasser, J. - - -	Bronzes.
Prussia - - -	267	Geiss, M. - - -	Statues in zinc, "Eve," &c. (and Special Appropriation).
United Kingdom -	652	Geriah, F. W. - - -	Locks and hinges.
France - - -	520	Gerrais, — - - -	Copper boiler with grata.
United Kingdom -	654	Gibbons, J., jun. - -	Locks.
United Kingdom -	324	Gillott, J. - - -	Metallic pens.
United Kingdom -	438A	Glover, T. (Cl. i.) -	Gas-meter.
United Kingdom -	380	Goddard, H. - - -	Cooking apparatus.
United Kingdom -	481	Goodbehere, G. T. -	Ship's stoves.
United Kingdom -	335	Goodman, G. - - -	Needles and pins.
United Kingdom -	403	Gray, J., and Son - -	Locks.

PRIZE MEDAL—continued.

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
United Kingdom -	262	Gray and Son - - -	Fire-irons, &c.
—	518	Gray, T. W. - - -	Brass-work, various.
—	66	Green, T. (Cl. IX.) - - -	Aviary.
—	39	Greening and Sons - - -	Strong wire cloth, woven by steam-power.
—	254	Griffiths, T. and F. - - -	Tin and enamel ware.
France - - -	1617	Grignon, M. - - -	Bronzes, &c.
Saxony - - -	37	Gruhl, F. - - -	A bell (very fine tone).
United Kingdom -	524	Guest and Chrimess - - -	Water-closet and fire-clocks.
France - - -	255	Hadrot, L. jun. - - -	Moderator lamps.
United Kingdom -	563	Hale, J. - - -	Curb chains.
—	282	Hammond, Turner, & Sons - - -	Buttons.
—	82	Handyside, A. - - -	Cast-iron fountain.
—	616	Hanson, J. - - -	Manufactured lead.
—	211	Harding, T. (Cl. xx.) - - -	Buttons.
—	284	Hardman and Iliffe - - -	Buttons.
—	660	Harley, G. - - -	Locks.
—	636	Hart and Sons - - -	Door-plates.
—	421	Haslam, W. - - -	Wrought-iron hinges, &c.
—	52	Hatfield, J. A. - - -	Statue in bronze.
—	318	Hawkins, J. - - -	Brass, copper, and iron screws and bolts.
—	97	Haywood, J. - - -	Church stove.
—	647	Haywood and Son - - -	Locks, gilding, &c.
—	331	Hemming, H. - - -	Fish-hooks.
—	316	Henn and Bradley - - -	Taper screws, &c.
United States -	124	Herring, S. C. - - -	Salamanca safe.
United Kingdom -	351	Hetherington, T. and C. - - -	Carriage lamps.
Prussia - - -	631	Hilgers and Sons - - -	Hardware.
United Kingdom -	326	Hincks, Wells, and Co. - - -	Metallic pens.
—	519	Hodges, T. - - -	Bells.
—	348	Holden, H. A. - - -	Carriage lamps.
—	1	Hood, S. - - -	Cast-iron enamelled stall & manger.
—	275	Horne, T. - - -	Curtain poles, &c.
—	334	Horsfall, H. - - -	Pins, and wire for fish-hooks.
United States -	486	Howland, C. - - -	Bell telegraph.
United Kingdom -	649A	Huffer, J. - - -	Locks.
—	609	Hughes and Kimber - - -	Copper & steel plates for engravers.
—	—	Ibbetson, Capt. L. L. B. - - -	Bronzing, iron and metallic castings—new method (and Special Approval).
—	304	Ingram, T. W. - - -	Buttons.
—	317	James, J. - - -	Fish-hooks and needles.
—	237	Jeakes, W. - - -	Stove grates (and Special Approval).
—	810	Jennings, G. - - -	Water-closet.
—	106	Jobson and Co. - - -	Radiating stove.
Prussia - - -	285	Kalide, T. - - -	Boy with swan, in bronze, &c.
France - - -	1632	Karcher, H., and Westermann, - - -	Articles in stamped iron.
United Kingdom -	76	Keep and Watkin - - -	Anvils, vice, &c.
—	601	Keith, G. - - -	Refrigerator.
—	327	Kell, A., and Co. - - -	Metallic pens.
—	604	Kennard and Co. - - -	Stoves and iron castings.
—	360A	Kenrick and Son - - -	Enamelled ware.
—	553	Kent, G. - - -	Knife-cleaning machine.
—	489	Kepp and Co. - - -	Copper bath.
Prussia - - -	299	Kesseler, C. - - -	Bronze statue of Polyhymnia.
United Kingdom -	96	Kirby, Beard, and Co. - - -	Pins, &c.
Austria - - -	434	Kitschelt, A. (Cl. xxiv.) - - -	Cast-iron vases, &c.
United Kingdom -	689 & 694	Knight and Forster - - -	Metallic pens.

PRIZE MEDAL—continued.

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
United Kingdom -	289	Knowles, H. - - -	Buttons.
Russia - - -	287	Krumbigel, — - -	Gilt-bronze candelabra.
United Kingdom -	32	Kuper, W. - - -	Metal ropes.
France - - -	1284	Lacarrière, A. - - -	Lustres, chandeliers, &c.
United Kingdom -	534	Lambert, T. - - -	Water-closet and diaphragm valve.
France - - -	293	Laureau, L. - - -	Figures, in a galvanized compound of bronze and pewter.
—	508	Laury, G. - - -	Stove-grates and stoves (and Special Approbation).
United Kingdom -	54	Lawrence, T. B. - - -	Perforated zinc, &c.
—	605	Lea, W. and J. - - -	Lock with bolts, &c.
France - - -	1644	Leococq, H. - - -	Ornaments in stamped brass, hot-air stoves, &c.
Belgium - - -	354	Lefebvre, V., and Co. - - -	Wire nails and rivets.
—	381	Limelette, F. - - -	Wrought nails.
United Kingdom -	357	Lloyd, G. B. - - -	Iron lap-welded tubes for steam-boilers.
—	105	Longden and Son - - -	Cooking apparatus.
—	382	Love, J. - - -	Gas stoves.
—	346	Lowe, J. and H. - - -	Carriage lamps, &c.
France - - -	1340	Mallat, J. B. - - -	Metallic gilt pens, &c.
United Kingdom -	370	Mapplebeck and Lowe - - -	Cooking apparatus.
France - - -	607	Marchand, J. B. - - -	Bronzes, various (and Special Approbation).
United Kingdom -	510	Marr, W. - - -	Safes.
—	363	Marrinan, J. P. - - -	Naval brass-work.
—	795	Marriott, W. - - -	Weighing machine.
France - - -	332	Marsaux and Legrand - - -	Stamped copper for decoration.
United Kingdom -	332	Martin and Gray - - -	Carriage lamps.
—	416	Massey, W., and Co. - - -	Brass flower-stand.
—	634	Masters, T. - - -	Ice apparatus.
Switzerland - - -	41	Mathey and Son - - -	Cylinder of rolled steel for watch springs.
Belgium - - -	359	Mathys, J. - - -	Strong box and polished stoves.
United States - - -	20	McGregor and Lee - - -	Bank lock.
United Kingdom -	684	Mears, C. and G. - - -	Bells.
France - - -	630	Méne, P. J. - - -	Bronzes of boar-hunt, &c.
United Kingdom -	340	Messenger, Samuel - - -	Bronzed and lacquered lamps (and Special Approbation).
Austria - - -	413	Metternich, Prince - - -	Stove for hunting-seat.
United Kingdom -	645	Miller, Geo. Alex. - - -	Signal lamps, &c.
—	642	Milner and Son - - -	Safes.
—	339	Mitchell, J. - - -	Metallic pens.
—	328	Mitchell, W. - - -	Metallic pens.
—	274	Moore, P., and Co. - - -	Iron and brass hinges.
France - - -	1666	Morel Brothers - - -	Moulded cast-iron, &c.
United Kingdom -	610	Morewood and Rogers - - -	Galvanized tinned iron sheets.
—	204	Mossman, W. (Cl. xxx.) - - -	Brass candlestick.
France - - -	934	Muel-Wahl, and Co. - - -	Chandeliers, fountains, &c.
United Kingdom -	683	Murphy, J. - - -	Bells.
—	338	Myers and Son - - -	Metallic pens.
—	638	Naylor, J. - - -	Lamps for pillars and wall brackets
—	36	Newall, R. S. - - -	Metal ropes.
—	87	Nicholson, W. N. - - -	Anglo-German cooking-stove.
—	332	Nicklin and Sneath - - -	Wire weaving.
—	491	Noirsain, J. - - -	Ventilating stoves.
United Kingdom -	424	Paddon and Ford - - -	Gas meter.
France - - -	671	Paillard, E. - - -	Copper and zinc frames for mirrors, &c.
United Kingdom -	447	Palmer and Co. - - -	Candle lamps.
France - - -	942	Palmer, J. L. - - -	Drawn wire.
Tuscany - - -	116	Papi, Clement - - -	Basket of flowers, cast from nature.

PRIZE MEDAL—continued.

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
France - - -	1379	Paris, E. - - - -	Galvanized sheet of iron, &c.
United Kingdom -	659	Parkes, H. W. - - -	Locks.
—	649	Patent Pointed Screw Company.	Pointed screws cast out of malleable iron.
France - - -	946	Paublan, — - - -	Safes and locks.
United Kingdom -	688	Perry and Co. - - -	Metallic pens.
—	61	Perry, E. - - - -	Japanned ware.
Netherlands - -	78	Potit and Fritsen - -	Bells with suspending apparatus.
United Kingdom -	371	Peyton and Harlow -	Metallic japanned bedsteads.
—	107	Pierce, W. - - - -	Cottage grate.
France - - -	963	Poirier, L. - - - -	Copying presses.
United Kingdom -	323	Potts, W. - - - -	Bronzes and lacquered lamps, &c. (and Special Approbation).
—	64	Purdy, C. W. (Main Avenue West.)	Gothic ornament.
Belgium - - -	356	Puisant, F. - - - -	Wrought-iron crucible and ornaments.
Wurtemberg - -	72	Rau and Co. - - - -	Japanned tin plate.
Netherlands - -	99	Regout, P. - - - -	Chandeliers (2 large and 2 small).
United Kingdom -	315	Reynolds, J. - - - -	Cut nails.
—	433	Rickets, C. - - - -	Gas stoves.
—	637	Riddle, W. - - - -	Apparatus for extinguishing fires in ships, signal lamps, &c.
France - - -	1440	Robert, A., and Co. -	Roll of tinfoil, &c.
United Kingdom -	189	Robertson, Carr, and Steel	Stove grates.
Wurtemberg - -	73	Rometsch, C. - - - -	Metallic writing slates (and Special Approbation).
United Kingdom -	278	Rowley, Charles - - -	Buttons.
Austria - - -	430	Salm, Prince - - - -	Cast-iron statue of Badetzky, considered as a specimen of casting (and Special Approbation).
United Kingdom -	343	Salt and Lloyd - - -	Bronze and lacquered lamps.
—	270	Simonite, J. - - - -	Tin and enamel ware.
Spain - - -	259	Sanchez Pescador - -	Bedstead of cast steel, with bronze ornaments (and Special Approbation).
Prussia - - -	405	Schleicher, C. - - - -	Galvanized steel wire.
France - - -	370	Schmautz, C., sen. - -	Letter-press rollers.
Prussia - - -	644	Schmidt, Caspar - - -	Kitchen stove.
Netherlands - -	98	Schutz, L. N. - - - -	Zinc castings.
United Kingdom -	90	Shave, W. J. - - - -	Stoves and ovens.
—	243A	Sherwin, J. - - - -	Kitchen range.
—	66	Shoolbred and Co. - -	Japanned ware.
Russia - - -	370	Shtange and Verfel - -	Bronze candelabrum.
United Kingdom -	433	Siebs, A. - - - -	Rotatory syringe.
—	321	Simcox, Pemberton, and Sons.	Brass-work, various.
—	295	Smith, Kemp, and Wright	Buttons.
Prussia - - -	802	Sommerueyer and Co. -	Iron safe, ornamented (and Special Approbation).
United Kingdom -	60	Steele, W. and P. - - -	Cooking apparatus.
—	-	Stirling, Morris J. D., (Main Avenue West).	Alloy bell, for cheapness. Patent.
Prussia - - -	199	Stobwasser, C. H., and Co.	Japan articles, &c.
United Kingdom -	422	Stocker Brothers (Cl. v.)	Beer machine.
Wurtemberg - -	60	Stohrer, J. F. - - - -	Brass and steel wire, &c.
Prussia - - -	779	Stollberg-Wernigerode, Count.	Cast-iron Gothic vase, &c.
United Kingdom -	443	Strode, W. - - - -	Gas stove.
France - - -	1023	Susse Brothers - - - -	Bronze candelabra, fountains, &c.
United Kingdom -	507	Tann and Sons - - - -	Safes.
—	622	Taylor, J. - - - -	Locks.

PRIZE MEDAL—*continued.*

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
United Kingdom -	682	Taylor and Son - -	Bells (and Special Approbation).
—	705	Thompson, T. H. - -	Sansatory trap, &c.
—	312	Timmins and Sons - -	Vices, hammers, &c.
—	55	Treggon, H. and W. -	Zinc window blinds.
France - - -	700	Trelon, Weldon, and Weil	Buttons and China knobs.
—	1512	Tronchon, N. - - -	Iron articles of furniture, &c.
Spain - - -	280	Trubia, The Royal Ord- nance.	Iron bust of King of Spain.
United Kingdom -	550	Tupper and Carr - -	Wire fencing (galvanized iron).
—	202	Turner, H. and W. - -	Fire irons.
—	63	Tylor and Pace - - -	Perforated metals.
—	401	Tylor and Son - - -	Bronzed ware and baths.
France - - -	1517	Vantillard and Co. - -	Tinned iron pins, &c.
—	1705	Verstaen, L. N. - - -	Strong boxes and safes.
United Kingdom -	381	Wakefield, F. - - -	Cooking apparatus.
—	29	Walker, E. - - -	Perforated brass.
—	242	Walker, R. (Cl. VIII.)	Metallic pens.
—	62	Walker and Co. (Main Avenue, West.)	Monumental brass.
—	670	Walters, B. and P. - -	Locks.
—	69	Walton and Co. - - -	Japanned ware.
—	& 701		
—	798	Warner and Sons - - -	Bronzed copper ware and bells.
—	290	Wells, J. T. - - -	Buttons.
—	600	Wenham Lake Ice Co. -	Refrigerator.
—	667	Whitehouse and Co. - -	Iron tubes and fittings.
—	356	Whitfield, Samuel - -	Brass cornices and safes.
—	242	Whitnee and Chapman -	Coffee mills.
—	30	Wilkins and Weatherly -	Metal ropes.
—	490	Wilson, R. and W. - - -	Baths, various.
—	668	Windle and Blythe - -	Locks and steel pens.
—	75	Wood Brothers - - -	Chain cables.
—	664	Yates, H. - - -	Locks.
—	384	Yates, Haywood, and Co.	Stove grates.
—	348	Zuccani B. (Cl. XXX.) -	Aviary.

III. HONOURABLE MENTION.

Prussia - - -	214	Action-Verein, Wilhelm- shutte.	Enamelled stone ware.
United Kingdom -	687	Aldridge, J. M. - - -	Door pivots.
—	253	Aikday, W. - - -	Bellows.
—	65	Archer, J. W. (Main Avenue.)	Monumental brass.
Austria - - -	665	Arrer, J. - - -	Pearl buttons.
United Kingdom -	301	Aston, J. - - -	Silk buttons.
—	681	Bamber and Son - - -	Mortice night bolt.
Prussia - - -	760	Baum, E. - - -	Stove, as a man in armour.
Austria - - -	438	Beitl, F. - - -	Two iron cash boxes.
United Kingdom -	438	Biddell, G. A. - - -	Gas burner, self-regulating.
—	297	Biddle, J. - - -	Letter clips, &c.
—	650	Bigford, H. - - -	Lock.
—	267	Bird, A. - - -	Hydrostatic siphon.
—	464	Black, B. - - -	Ornamental carriage illuminator.
Prussia - - -	623	Bleckmann, J. E. - -	Tools, locks, &c.
Wurtemberg - -	94	Blumhardt, H. - - -	Fire tongs.
France - - -	769	Boche, M. - - -	Powder flasks, &c.
—	770	Boeringer and Co. - -	Door security bolt.
United Kingdom -	426	Botten, C. - - -	Protector gas meter, for preventing fire-damp.

HONOURABLE MENTION—continued.

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
France - - -	433	Boulonnois - - -	Various bronzes.
United Kingdom -	575	Bradnack, J. R. - - -	Knocker and letter-plate for door.
Prussia - - -	621	Brauschweig, J. A. - - -	Tools.
United Kingdom -	500	Bray, C. - - -	Cooking utensils, &c.
-----	247	Burtou, W. S. - - -	Ornamental fenders.
France - - -	1132	Carle, A. T. - - -	Specimens of brass founding.
Prussia - - -	655	Caron, J. M. and Co. - - -	Samples of buttons, plated.
France - - -	1135	Carrier-Rouge - - -	Bronze, chandeliers, &c.
United Kingdom -	592	Carson, - - -	Machine for preserving meat.
France - - -	117	Charles and Co. - - -	Machine of galvanized iron, for washing.
-----	449	Chauvin, G. - - -	Purse trimmings.
-----	151	-----	-----
Canada - - -	155	Cheney, G. H. - - -	Stoves, &c.
-----	156	-----	-----
-----	159	-----	-----
United Kingdom -	11	Chopping and Maund -	Concave horse-shoe.
-----	158	Cochrane, A. (Cl. vii.) -	Lock and ventilator.
-----	100	Collier and Son - - -	Coffee-roasting apparatus.
-----	573	Collinge, C., and Co. -	Patent door-hinge.
-----	16	Cook, William - - -	Improved horse-shoe, for general use.
-----	320	Cooksey, H. R. - - -	Coffin furniture.
-----	57	Crook, F. (Cl. xxx) - -	Wrought-iron water lily.
France - - -	131	Cadruet, F. - - -	Window-rod fasteners.
-----	99	Cugnot, A. - - -	Locksmith's work and ironmongery.
United Kingdom -	754	Culverwell, W. - - -	Portable vapour bath.
France - - -	1168	Daniel, E., jun. - - -	Ornamental steel purse.
United Kingdom -	445	Debauffer, H. - - -	Concentrating gas lamp, for the exterior illumination of shop-windows.
France - - -	1582	De la Cour, L. F. - - -	Bronze and cast-iron articles, &c.
Russia - - -	324	Demidoff, Messrs. - - -	Malachite vases.
France - - -	145	Dervaux-Lefebvre - - -	Chains, bolts, &c.
-----	1483	De Sérionne, Loin, and Co. -	Buttons, &c.
-----	819	Deydier, Mad. - - -	Zinc dormer windows, &c.
-----	824	Ducel, S. J. - - -	Iron castings of statues, animals, &c.
Prussia - - -	641	Dultgen, Brothers - - -	Pad and portfolio locks.
Jersey and Guernsey	9	Du Pre, W. H. - - -	Wind guard, &c.
France - - -	151	Duval and Parie - - -	Bronze lamps, &c.
Austria - - -	427	Eberstaller and Schindler -	Iron and steel wire, &c.
United Kingdom -	241	Edwards, D. O. - - -	Atmopyre hoods and gas stove.
-----	315	Edwards, E. - - -	Inkstands, glass screws, &c.
Prussia - - -	660	Eichelburg, H. D., and Co. -	Window curtain, in frame of brass.
-----	86	Ellis, W. - - -	Kitchen range and bath apparatus.
Austria - - -	457	Ernst, P. - - -	Nails, assorted.
United Kingdom -	560	Farrow, C. - - -	Machines for wine and other liquors.
Belgium - - -	380	Fauconier-Delire (Widow) -	Wrought nails.
United Kingdom -	502	Faulding, J. - - -	Portable vapour bath by spirit lamp.
France - - -	1691	Faye, P. G. - - -	Bronze clocks, &c.
-----	1601	Fetu, J. - - -	Bronze chandeliers, &c.
United Kingdom -	508	Fisher, J. N. - - -	Cash-box.
-----	13	Fogarty, J. - - -	Horse-shoes.
France - - -	508	Fondet, sen. - - -	Warming apparatus.
United Kingdom -	35	Fox, T. H. - - -	Bird cages.
France - - -	513	Fumet, C. F. - - -	Apparatus for artificial ice.
Prussia - - -	103	Gaertner, A. - - -	Parrot cage, German silver.
France - - -	225	Gaillard, jun. - - -	Wire gauze, &c.
United Kingdom -	556	Gidney, J. W. - - -	Wire fencing.
France - - -	819	Gillot, F. - - -	Clocks, &c.
United Kingdom -	238	Glenton and Chapman -	Polished register stove.
Belgium - - -	357	Gob, J. - - -	Wrought-iron strong box.
United Kingdom -	374	Gorton, G. - - -	Stove grate and fender.

HONOURABLE MENTION—continued.

Nation.	No. In Catalogue.	Name of Exhibitor.	Objects Rewarded.
United Kingdom -	66	Gould, — - - -	Monumental brass, inlaid steel figures.
Austria - - -	469	Grabner, F. - - -	Jews' harps.
France - - -	1236	Grangoir J. M. - - -	Locks, &c.
United Kingdom -	431	Grant, D. - - -	Gas stoves.
Prussia - - -	653	Greef, jun. - - -	Samples of buttons.
France - - -	252	Guinier, T. - - -	Water-closets and cocks.
United Kingdom -	4	Guy, S. - - -	Horse-shoes.
—	432	Haldane and Rae - - -	Water-closets, &c.
—	486	Hale, T., and Co. - - -	Bells, kettles, &c.
—	612	Hampden, J., and Co. - - -	Enamelled zinc.
—	263	Handa, J. - - -	Brass-work cornices, &c.
—	555	Harrison, W. - - -	Enamelled frying pans.
Sweden and Norway	11	Hedlund, J. - - -	Padlock.
United Kingdom -	271	Hickman and Clive - - -	Coffin furniture.
—	65	Hill, E. and Co. - - -	Patent bedstead, with iron pillars, &c.
—	335	Hill, J. - - -	Stamped brass ornaments.
—	15	Hillman, J. - - -	Improved horse-shoes.
—	450	Holgate, J. - - -	Signal lamps.
—	448	Holliday, R. - - -	Gas lamp.
—	12	Holmes, Capt. - - -	Improved horse-shoes.
Prussia - - -	648	Hosterey, G. - - -	Samples of buttons (plated).
Austria - - -	428	Hueber, F. - - -	Iron and steel wire.
France - - -	880	Huet, J. - - -	Purse-trimmings, &c.
Prussia - - -	632	Huth, Fried. and Co. - - -	Vices, &c.
United Kingdom -	406	Huxhams and Brown - - -	Stoves.
—	236	Huxley and Heriot - - -	Gas stoves, hydraulic ditto, &c.
—	311	Jackson, W. - - -	Tools for tin and copper ware.
France - - -	887	Jaudin, A. - - -	Tinfoil and coloured spangles.
United Kingdom -	14	Jones, G. - - -	Improved horse-shoes for frosty weather.
—	407	King, S. - - -	Stove grates (ventilating principle).
Prussia - - -	196	Kobesch, H. - - -	Iron safe.
Canada - - -	151A	Ladd, C. P. - - -	Balance scale.
France - - -	288	Lang, L. - - -	Wire gauze, &c.
United Kingdom -	506	Leadbeater, J. - - -	Fire-proof safes.
—	108	Leale and Albrecht (Cl. xix.) - - -	Cake moulds and temple.
Prussia - - -	197	Lehnmann, A. F. - - -	Iron crucifix, &c.
France - - -	1315	Lemaire, A. - - -	Brass curtain ornaments.
United Kingdom -	673	Lewis, G. - - -	Lock on circular levers.
—	503	Longfield, W. - - -	Ornamental iron safe.
France - - -	1332	Luce, P. - - -	Mantelpiece, ornamented with a mirror.
Netherlands - -	100	Lurasco Brothers - - -	Bronze statues, &c.
Belgium - - -	378	Macquinnay Brothers - - -	Wrought nails.
United Kingdom -	639	Macbell, J. C. - - -	Patent portable steamer-bath.
—	261	Malin and Sons - - -	Brass-work, cornices, &c.
—	313	Manly, J., jun. - - -	Ornamental nails.
Belgium - - -	120	Marcinelle and Couillet - - -	Samples of nails, &c.
France - - -	614	Smelting Company. Martin, O., and Very Brothers.	Cast-iron ornamental work.
Austria - - -	698	Metzner, W. - - -	Pearl buttons.
United Kingdom -	9	Miles, W. - - -	Horse-shoes (various).
Austria - - -	467	Mitterberger, J. - - -	Shoe-tips and heels.
United Kingdom -	669	Moreton and Langley - - -	Lock, and general hardware.
France - - -	931	Morisot, N. J. - - -	Bronzes, &c.
United Kingdom -	333	Morrall, A. - - -	Needles.
—	104	Morton, J. - - -	Fenders and cast-iron table.
—	498	Moss, P. - - -	Copper vapour-bath by spirit-lamp.

HONOURABLE MENTION—continued.

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
Prussia - - -	287	Müller, — - - -	Ornamental castings in bronze.
United Kingdom -	793	Murray, W. - - -	Tubular filter.
— - -	285	Neal and Tonks - - -	Buttons.
— - -	388	Nettleton and Son - -	Gothic church-ventilating stove.
France - - -	662	Neuberger - - - -	Lamps, &c.
United Kingdom -	640	Nixey, W. G. - - -	Patent till.
— - -	249	Onions, J. C. - - -	Bellows.
— - -	658	Osmond, G. - - -	Sash-fastenings, &c.
France - - -	683	Paul Brothers - - -	Braziers.
United Kingdom -	73	Perry, J. - - - -	Copying press.
France - - -	954	Petithomme, L. A. - -	System of suspension for bells.
United Kingdom -	281	Pigott and Co. - - -	Buttons; Naval buttons.
Austria - - -	433	Pleischl, A. - - -	Sheet-iron saucepans in uon-metallic enamel.
United Kingdom -	17	Plomley, W. - - -	Model of an improved horse-shoe.
United States - -	{ 414 }	Pond and Co. - - -	Cooking stoves.
— - -	{ 434 }	— - - -	— - - -
United Kingdom -	243	Pope and Son - - -	Double-action rarefying stoves.
— - -	239	Prideaux, J. S. - - -	Grate, feeding at bottom; draining machine.
United Kingdom -	465	Pyrke and Sons - - -	Bronze urns, &c.
France - - -	975	Rebert, C. - - - -	Door-fastenings.
— - -	979	Regnaud, J. - - -	Copper cake-moulds.
United Kingdom -	449	Rettie and Sons - - -	Signal-lamps.
Wurtemberg - -	62	Rexer, C. - - - -	Brass and steel wire and gauze.
Canada - - -	150A	Rice, W. - - - -	Wire fencing.
Hamburgh - - -	50	Richter, J. M. S. - -	Brass parrot cage.
Prussia - - -	639	Ritzel, L. (Widow) - -	Metallic buttons.
France - - -	1447	Robin, L. - - - -	Bronze cups, &c.
United Kingdom -	437	Roper, J. - - - -	Transparent gas-meter.
— - -	436	Ryan, J. - - - -	Transparent gas-meter.
Austria - - -	429	Schedl, C. - - - -	Iron and steel wire.
Prussia - - -	646	Schmidt, P. L. - - -	Iron and brass wares.
Austria - - -	470	Schwarz, C. - - - -	Jews' harps.
— - -	471	Schwarz, F. jun. - - -	Jews' harps.
— - -	472	Schwarz, F. sen. - - -	Jews' harps.
— - -	473	Schwarz, J. - - - -	Jews' harps.
United Kingdom -	480	Searle, C. M.D. - - -	Tubulated solid brick-heating stove.
Hesse, Grand Duchy of	50	Seebass, A. R. - - -	Cast-iron and steel ornaments.
United Kingdom -	438A	Shears and Son - - -	Patent dry gas-meter.
— - -	243A	Sherwin, J. - - - -	Economic range, hot closet, and bath.
Belgium - - -	358	Sieron, L. - - - -	Nails, termed "Clous de Paris."
France - - -	1017	Siroi, F. sen. - - -	Copper and steel pegs for shoes.
United Kingdom -	220	Skeltons, S. and R. - -	Shovels and spades.
— - -	452	Smiths and Co. - - -	Carriage, rail, &c., lamps.
— - -	304	Souter, W. - - - -	Copper bronzed urns.
— - -	430	Sparkes, J. - - - -	Cash-box for railways.
— - -	461	Squire, R. - - - -	Signal lamps.
— - -	7	Stevens, H. R. - - -	Horse-shoes and plates.
— - -	252	Stokes, J. C. - - -	Water-closet, brass taps, &c.
France - - -	1497	Tachy, A., and Co. - -	Needles for blind people.
— - -	1039	Taillefer, A., and Co. -	Galvanized needles and pins.
United Kingdom -	251	Taylor, S. - - - -	Ornamental bellows.
Prussia - - -	624	Thomas, Christian - - -	Hardware.
Austria - - -	419	Thuruschels, Count G. -	Steel and iron for nails.
France - - -	703	Truc, — - - -	Lamps, &c.
Prussia - - -	636	Turk, P. C. (Widow) - -	Metal buttons.
United Kingdom -	-	Turner, — - - -	Post-office window, double-action fastenings.
— - -	270	Twigg, G. and W. - - -	Naval buttons.
Prussia - - -	355	Ullenberg and Schnitzler	Screws and wire.

HONOURABLE MENTION—*continued*.

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
Austria - - -	460	Vingert, A. - - -	Nails, assorted.
Belgium - - -	355	Vandercasner, J. A. - - -	Zinc vessels.
France - - -	1531	Voizot, E. - - -	Steel for jewellery.
United Kingdom -	413	Wallace and Son - - -	Cooking apparatus.
—	248	Warriner, G. - - -	Gas cooking stove.
Prussia - - -	634	Wescher Brothers, and Strassman.	Buttons, &c.
United Kingdom -	636	Whitley, J. - - -	Wrought-iron hinges.
Jersey and Guernsey	12	White, George - - -	Ventilator and guard.
United Kingdom -	10	Whitehead, — - -	Horse-shoes.
Prussia - - -	282	Winckelmann, J. - - -	Electrotypes.
United Kingdom -	525	Wiss, R. - - -	Self-acting water-closet.
—	276	Wolverson, E. - - -	Lock.
—	8	Woodin, D. - - -	Horse-shoes (various).
—	33	Woods, W. - - -	Hooks and eyes, chains.
—	347	Woolridge, J. - - -	Brass fittings, &c.
Denmark - - -	23	Wulff, — - - -	Two brass tea-urns, executed by hand.
United Kingdom -	442	Young, W. - - -	Vesta lamps.
Frankfort-on-the- Maine.	19	Zimmermann, E. G. -	Iron and zinc ware.

W. DYCE, R.A., *Reporter*.*London, October 1851.*

APPENDIX.

(A.)

Extract from Minutes of the Jury for Class XXIX.

"Messrs. Hoffman and De la Rue report, that they have conferred with the Chairman and Jurors of Class XXII, from whom they learn that in the English and Foreign sections there are no less than 46 exhibitors of lamps. As it is clearly impossible to examine and test experimentally so large a number of lamps, Messrs. Hoffman and De la Rue suggested that the Jury of Class XXII should select three lamps only which they considered ought to be so tested. The Jury of Class XXII explained that much difficulty might arise in such a selection on their parts, as the exhibitors whose productions were not tested might complain that justice was not done them. Messrs. Hoffmann and De la Rue fully agree in this view, and therefore for the present leave the decision of the proper course to be pursued, to the Jury of Class XXII, expressing at the same time their willingness to aid them to the best of their ability in any experimental inquiry which time will allow."

(B.)

REPORT OF SUB-JURY A. OF CLASS X. ON "BELLS."

The Jurors of Class XXII. having requested the assistance of the Jury Class XA., in the examination of Bells, those Jurors of Class XA., who attended for that purpose, have to submit the following Report:—

Bells examined, June 4th, 1851.

MEARS.—A large bell (in key of F), excellent.

MURPHY (Dublin).—A large bell, very fine tone.

MURPHY (Dublin).—A large bell in the East Nave, connected with clock (said to have been "cast in tune"). Very fine tone.

HODGES.—Four ship bells; good tone and powerful. The *brass* bell of remarkably pure and good tone, and of great power.

TAYLOR (Loughborough).—Two bells, excellent.

WARNER.—Three bells. The middle one is of a very pure tone.

PETIT and FRITSER (Netherlands).—Bells, with suspending apparatus. Good though if considered as a *scale* of bells, some of them are not perfectly in tune.

F. GRUHL, (Saxony).—A bell in East Nave. Very fine tone.

——— A bell and frame, in gallery. Tone pure and good.

HODGES (Dublin).—A large bell. Excellent.

N.B. The *Gongs* in the Chinese Collection are reported upon by Class XA. as belonging to a certain class of musical instruments.

(Signed) H. BISHOP, Knt., *Chairman.*

CLASS XXIII.

REPORT ON WORKS IN PRECIOUS METALS, JEWELLERY,
ARTICLES OF VERTU, &c.*Jury.*

- ALBERT, DUC DE LUTNES, *Chairman and Reporter*, France; Member of Institute, &c.
 HENRY HOFF, M.P., *Deputy Chairman*, Piccadilly.
 DON FRANCISCO ELOIZA, Spain; Colonel of Artillery.
 JAMES GARRARD, Prime Warden of the Goldsmith's Company.
 JOHN GRAY, 5 Billiter Square, City; Silversmith and Plater.
 L. GRÜNER, Zollverein; Architect.
 EARL LOVELACE, Turkey.
 WESTLEY RICHARDS, Birmingham; formerly Plater and Jeweller; Chairman of the Birmingham Exhibition in 1849.
 CHARLES SALLANDROUZE DE LAMORNAIX, France; Commissioner-General of Government; Member of Council of Manufactures and of Central Jury, &c.
 ROBERT YOUNG, Sheffield.

Associates.

- WILLIAM THOMAS BRANDE, Royal Mint; Professor of Chemistry.
 NICOLAS FRANÇOIS LE DAORE, Judge of the Tribunal of Commerce of the Seine, and Member of the Chamber of Commerce at Paris.
 GEORGE MATHET, 57 Hatton Garden; Metallurgical Chemist.
 PERCYAL NORTON JOHNSON, 57 Hatton Garden; Metallurgical Chemist.
 THOMAS VASEY, Monmouth Court, Whitcomb Street; Setter of Diamonds.

WORKS in all kinds of precious metals occupy a considerable place in the Exhibition. It would, however, be difficult to form from them an exact idea of the relative production of different countries in the various branches of this class of manufactures. Germany has contributed to a very limited extent; Spain has sent but one specimen of her beautiful workmanship in gold and silver for church service: several French manufacturers of gilt bronzes have not exhibited at all: the Dutch jewellers' work is represented by only a single Exhibitor: from Sweden, Denmark, Bavaria, and the kingdom of Naples, nothing has been received: America has furnished but an insignificant display: and other exhibitions, hurriedly formed, do not truly represent the actual production of the respective countries. Thus, China offers a miscellaneous collection of objects, some of them made several centuries ago, others of English manufacture or borrowed from private individuals. The Indian exhibition is a treasury of riches accumulated by the East India Company, belonging to widely-different epochs, amongst which it would be difficult to distinguish at once what is modern. The Ionian Islands are represented by a few specimens only.

From the above it is evident that the Jury were compelled to be on their guard against error in their general appreciation of the productions—error which the uncertainty of a first experiment of a Universal Exhibition, the remoteness of

some countries, and the reluctance of some manufacturers to come forward, must of necessity entail. The information asked for of the foreign Commissioners would have been very useful towards drawing up more exact commercial observations; but not having received it in time to be of service, the Jury have confined themselves to the Exhibition itself.

It is sufficient to cast a glance upon the exhibitions of India, Turkey, Egypt, and Tunis, to be convinced that these nations have remained stationary from a very early period of manufacture. Some of them, indeed, develop ideas full of grace and originality; but their productions are always primitive and imperfect, and the skill of the workman is called in to make amends for the inadequateness of the manufacturing resources. Their exhibitions might, nevertheless, afford a lesson to the European manufacturers, for they display a natural grace in the arrangement of ornaments most happily conceived. Jade inlaid with precious stones by means of golden bezils, as shown upon some of the very ancient articles in the Indian exhibition, is an elegant and skilful work of art. The filigree from the same country is as perfect as that from China; and the Indian enamels, though for the most part coarse, exhibit, nevertheless, much merit in design and harmonious arrangement of colour.

The European nations must, by the means here afforded for comparing their productions, render each other mutual service. France and Germany will borrow from England whatever is worthy of imitation in her manufacture of plate for useful purposes; while England may derive instruction from the gold and silversmiths of the Continent, in reference to objects of ornament cast or *repoussé*, and finely chased. Gilt bronzes likewise may become better appreciated, and be manufactured upon a larger scale. In the setting of precious stones, jewellers will call to mind the beautiful productions sent by Russia. Regarded in an artistic point of view, the French, German, and Russian exhibitions will leave permanent traces behind them; and every nation, according to the amount of its genius for imitation or invention, will easily discern the onward path it ought to follow. The same advantage will arise from the improved or novel processes brought to bear upon the working of precious metals. Every nation has its peculiar methods of casting, mounting, fitting up, and finishing, which have not escaped the attention of manufacturers and intelligent artisans. Gold-plating, silver-plating, the electro process, stamping, the imitations of gilding and silvering, maintain an important position in industry and commerce. The inferior metals or alloys, bronzed, silvered, or gilt, the imitation jewellery, and artificial stones, are estimated according to their quality, and are largely used in European commerce, and as articles of export. The working of precious metals under their various forms is applied to objects of domestic use and sanitary purposes, and to the fine arts. In this respect the Exhibition offers every advantage for the instruction of practical men, and of those who have a just appreciation of traditional taste, and the demands of civilized society.

ELKINGTON, MASON, and Co, New Hall Street, Birmingham (1).—Messrs. Elkington and Mason are the first who introduced into England the application of the electro process to gilding and silvering. Their collection includes objects most varied in their forms and dimensions, intended for table service and for purposes of ornament, executed for the most part in copper, or in a compound

metal alloyed with nickel, called German silver, and coated with silver by their electro process. The designs are generally produced in copper by the electrotype process, and afterwards wholly or partially gilt or silvered by means of electricity, combined with the alkaline salts of gold and silver.

Several vases, such as copies of the cups from Herculaneum and Pompeii, and various articles of ornament, are made entirely of pure silver deposited by the action of electricity. They are usually lined with wrought metal, either to give them regularity of form in the inside, or to render them fit for use. The Jury have particularly noticed, among the works of Messrs. Elkington and Mason, the beautiful group entirely of cast silver representing Queen Elizabeth on horseback between a gentleman in waiting and a page, after a model executed by M. Jeannest, a French artist. This group is, in the opinion of the Jury, a very choice work of art: but they specially recommend for the Council Medal the large jewel-case of gilt and enamelled copper, ornamented with portraits upon porcelain of the Royal family, and with figures in full relief after designs by M. Gruner; and also the large circular plate called the Shield of the Amazons, a reverse copy of the original work, silvered and gilt in parts. These works of art and ornament offer the best specimens of the application of the electrotype process for the exact reproduction of objects in copper, and of precious metals to ornamental purposes.

The Jury, however, desire to guard against being considered as expressing an opinion on the merit of the application of the electro process of *silver* plating to objects of domestic use. They desire only to commend the artistic application of this discovery, to which alone they are inclined to think it adapted. At the same time they acknowledge that the application of *gold* by this process is a high-meritorious invention, tending alike to the economy and durability of the metal applied, and to preserve the health of the artisan from the dangerous emanation of quicksilver vapours.

MOREL, J. V., and Co., 7 New Burlington Street, London (117), exhibit a small number of objects, the greater part of which are worthy of attention from the care and taste displayed in their execution. Among these are different pieces of plate for table-service, including a centre-piece in the style of Louis XV., executed with much care: a bouquet in rubies and diamonds of the first quality, representing a rose, a tulip, and a volubilis—this can be taken to pieces by a very ingenious contrivance, and transformed into a stomacher, head-dress, brooches, and bracelet; the rubies, which are of a very even colour, are set in bezils of gold:—a vase of silver gilt, ornamented with a silver bas-relief, the subject of which is a hunt amongst branches of oak, executed in the style of Albert Durer; the chasing of the bas-relief is admirable:—a silver-gilt sugar-basin, with cover, of faultless shape, and chased with ornaments in relief, very much deadened and of rare perfection. But the principal object of the Jury's approbation is the rich and handsome series of chalices and cups of various kinds in precious materials, ornamented with enamels, exhibited by Messrs. Morel and Co. They would instance, especially a cup of Oriental agate, the gold mountings of which are composed of enamelled ornaments and birds of Paradise: the pillar is ornamented with chimera in relief, enamelled, surrounding the escutcheon of H. I. H. the Hereditary Grand Duchess of Russia; and the foot is covered with beautiful

arabesques enamelled : the taste displayed in this article is excellent, its composition is original, and it is very well executed after models by M. Mévillé. A nautilus shell of lapis-lazuli, supported by two enamelled figures of Tritons entwined with marine plants and flowers, and resting upon a rock covered with water and coral : the handle is formed of a chimera exquisitely enamelled, a copy of one on a celebrated cup in the Louvre : the manner in which this article is executed gives evidence of as much skill as taste : the model of the Tritons is the talented work of M. Constant Sévin. In the same rank must be placed another cup in Oriental agate, made in the form of a sea-shell (*plagiostoma*). The pillar is composed of a female figure, borne by a Triton with horse's fore-legs : at the back part of the shell is the handle of the cup, formed by another female figure sitting upon a dolphin and holding her flying drapery, the extremities being supported by Cupids : all these figures are enamelled with superior taste. Two other vases in rock crystal also merit special mention. The first is an ewer with its dish of the same material, engraved with fine arabesques : this portion of the article is in the style of the sixteenth century : the mounting is copied from the celebrated ewer in the museum of the Louvre, the enamelled gold mountings of which have served as the model : this is a masterpiece of imitation, and has been executed by the order and under the direction of Mr. Webb, an enlightened lover of the fine arts. A vase, mounted in gold and enamel, is remarkable for the extreme delicacy of its carved enamels, and for the skilful execution of the figures and ornaments. Many other articles of the same description and of similar quality constitute a whole which the Jury regard as worthy of a Council Medal.

WEISHAUP, C. M., SONS, Hanau (412, Prussia), exhibit a set of chess-men and board, the pieces in gold and silver, partly enamelled, and representing the Courts of Charles V. and of Francis I. They are entirely cast and nicely executed. The board exhibits superior qualities. It is made of silver, supported by four Mermaids of silver gilt and enamelled in parts : from their shoulders hang garlands of enamel, ornamented with rubies and pearls, held up by gilt figures of children standing upon tortoises. Upon various parts of the garlands are placed herons of silver with blue enamelled wings. The squares of the chess-board are composed of mother-of-pearl and tortoiseshell. The whole is remarkable for its choice workmanship, and for the very skilful combination of silver with enamel and fine stones : the garland especially is executed in excellent taste, and must have presented considerable difficulties in mounting and enamelling. The Jury consider Messrs. Weishaupt deserving of a Council Medal for this happily-conceived and well-executed work.

GARRARD, R. and S., and Co., Pantion Street, Haymarket, London (98), exhibit a collection of articles in precious metals and in jewellery, the *ensemble* of which is extremely rich, proving the immense extent of the manufacture of works in gold and silver in England.

There is, among the articles made in silver by Messrs. Garrard, a complete tea-service, consisting of seven pieces including the tray, in the Persian style, of very fine workmanship, the whole, with the exception of the small figures on the covers, made of silver in *repoussé* work. A table-candlestick with three branches, in the Queen Anne style, well conceived and very finely executed. A candlestick without branches, of a hexagonal shape, very well made, in *repoussé* work.

A candelabrum with six branches, ornamented with foliage and fruit, of elegant design. A tea and coffee-service in *repoussé* work, with cast handles, which, though of a style rather undecided, is of very appropriate workmanship. Several other durable and well-made trays and tea-services. A large ewer for a race-cup, representing Hercules combating the horses of Diomedes, and surrounded by ornaments and emblems symbolical of the labours of Hercules. The handle represents the hydra of Lerna. This piece of plate, entirely cast, has a grand effect, and its *ensemble* gives it a real importance: the subject is well chosen, and the composition original. Several covered dishes, one of them of hexagonal shape, the others of the patterns known as the "bead and scroll" and the "bead and shell," show the care and solidity with which plate for the table is made in England.

Annexed is an abridged catalogue of the principal articles of jewellery exhibited by Messrs. Garrard:—Necklace, stomacher, earrings and bracelet, in magnificent opals and brilliants, a noble and tasteful set;—a very rich set of magnificent sapphires, pearls, and brilliants:—a tiara enriched with fine oriental pearls, and large brilliants of great purity, with a brooch to accompany it:—an elegant gold bracelet of Gothic design, on which are chased out, upon a trellis-work of gold on blue enamel carved in the style of the fifteenth century, two angels holding a pearl and a ruby, and capable of being detached; the design by Mr. Smith:—a pearl necklace, with a circular medallion of rubies and brilliants, well made and in good taste: a pendant in the renaissance style, with figures in gold, rubies, brilliants, and pearls, upon green and red enamels, of fine workmanship:—a gold chased bracelet with a centre of emeralds and brilliants; the stones are fine and pure, and the bracelet is well chased. Another bracelet of bright gold, its centre ornamented with rubies and brilliants in imitation of the sculptures of Nineveh, a curious and carefully-executed copy, singular for the great antiquity of the model from which it has been taken: several brooches and rings, of which fine and scarce stones are the principal ornaments. This exhibition, taken as a whole, indicates manufacturing capabilities of the highest order, and an attentive study of all that can conduce to progress in this branch of national industry; and for these reasons the Jury recommended Messrs. Garrard for the Council Medal.

HUNT and ROSKELL, 156 New Bond Street, London (97).—The exhibition of Messrs. Hunt and Roskell presents an assemblage of articles of rare magnificence. The Jury being required to point out those which they prefer, would direct attention to certain objects of special excellence, and particularly to some very beautiful bracelets; one in emeralds and diamonds; another in opal and emerald, with white enamel; a third, which has a charming effect, composed of a fine opal, surrounded by brilliants and small emeralds upon white enamel, with foliage of gold. The Jury also mention with praise a bouquet of diamonds, as rich as it is elegant: which can be entirely taken to pieces, even to the petals of the flowers, for the purpose of cleaning, and for forming into seven brooches; and which but for its weight would defy criticism. The Jury however, prefer, among all the articles in Messrs. Hunt and Roskell's exhibition, the vase executed in *repoussé* silver by M. Vechte, which was shown several years ago in an exhibition at the Louvre, representing the fight between Jupiter and the giants. The deity, represented sitting upon his eagle, forms the cover of the vase: upon the body and

handles are the giants endeavouring to scale the heavens, and hurling trees and rocks at Jupiter: at the foot lie allegorical figures in alto-relievo: other figures are engraved upon the ground of the vase in very low relief, with a matted background. The same artist, M. Vechte, has commenced for Messrs. Hunt and Roskell a large shield, in three oval compartments, representing the apotheosis of Milton, Newton, and Shakspeare. The Jury recommended a Council Medal to be awarded to Messrs. Hunt and Roskell for the Jupiter vase and for the bouquet of diamonds.

HANCOCK, C. F., 39 Bruton Street, Berkeley Square, London (112).—The articles shown by this exhibitor are to be noticed, not for the large number displayed, but for their peculiar qualities considered in an artistic point of view. Mr. Hancock, while respecting the traditions of English art, has been desirous of introducing into it improvements of a special kind; and by the variety and versatility of style observable in his works he seems to have attained this object. The principal articles are, a round ebony table inlaid with silver, upon which is a silver vase in the form of an antique hydra with three handles, covered with palm-leaf ornaments and burnished foliage upon a matted ground: all the ornaments are made separately, and soldered to the vase, which is hammered out of a single plate. The table is inlaid with much care and taste; the feet are in German silver electroplated. Two groups for racing-prizes, in good taste, and carefully executed. The first represents Queen Elizabeth on horseback, accompanied by a page and a gentleman in waiting, with two greyhounds following, executed after a model by M. Marochetti, the dogs after models by Mr. Macarthy: the second, Robin Hood contending for the archery-prize in presence of the sheriff of Nottingham, after a drawing by M. Eugène Lamy. An ebony box, mounted in silver, after drawings by M. Eugène Lamy, remarkable for its fine *ensemble* and for its silver mountings, and beautifully sculptured and of good effect, in the style of Louis XIV. Upon the lid is a large water-colour drawing, representing genii bearing the colours of the 79th Cameron Highlanders, to whom the box was presented by M. Demidoff; and on the inside of the lid is a fine water-colour drawing of the rock of Gibraltar. Several other articles exhibited by Mr. Hancock are worthy of being mentioned, such as the group in silver of a knight combating a dragon and a lion, after a model by Mr. Macarthy,—a desert-plate, with knife, spoon, and fork, the whole ornamented with vine leaves, and wrought in silver carefully and gracefully: a good silver candelabrum, in the foliated style of Louis XIV., with five branches formed of acanthus leaves; and several other articles in the ornamental style for table use. The whole of Mr. Hancock's exhibition shows an accurate knowledge of the silversmith's craft, and of the resources which art can apply to this branch of industry when it is properly brought to bear upon it. The Jury are of opinion that on these grounds Mr. Hancock is deserving of the Council Medal.

MARREL BROTHERS, 27 Rue de Choiseul, Paris (331, France).—The principal article exhibited by Messrs. Marrel is the vase representing the combat of Theseus with the Amazons, after the celebrated picture by Rubens. This copy in alto-relievo of a picture as much noted for its composition as for the complex character of the scene represented, offered considerable difficulties to the artist, which he has surmounted with unquestionable success. The bas-relief is in bronze silvered: it is repeated upon the two sides, and fixed to the frieze of the vase.

The vase itself is executed in bronze gilt, in the Louis XIV. style, and bears the arms of its owner, His Royal Highness the Duc d'Aumale: the handles represent Amazons upon sea-horses. A silver cup in the renaissance style, richly ornamented with figures;—another by the same artist, with medallions of bacchanalian figures, partly in *repoussé* work and partly chased and gilt;—another of silver gilt, inlaid with arabesques of blue enamel: these form but a portion of this remarkable collection. The Jury would further mention a very beautiful silver hunting knife, the hilt of which represents St. Hubert standing within a niche: the cross is ornamented with a fox at bay, defending itself against several dogs: upon the chape of the sheath is a handsome bas-relief, representing the conversion of St. Hubert, and lower down is a hunting trophy. The execution of this hunting knife leaves nothing to be desired. The same maker shows some seals ornamented with beautiful little figures, office articles, scent-bottles in lapis-lazuli, Venetian aventurine, jasper, enamels, snuff-boxes, and other boxes of most varied styles and perfect workmanship, both in enamelling and chasing. Notwithstanding the merits of the other pieces, it is especially for this latter portion that the Jury recommended Messrs. Marrel for the Council Medal.

RUDOLPHI, J. F., 3 Rue Tronchet, Paris (1465, France).—The articles exhibited are of a most varied description; among others is a Byzantine casket in the form of a shrine; the portion of the lid forming the roof is ornamented with blue enamels, and the sides with other enamels of figures of angels upon golden and green back-grounds: upon the summit of the roof is a representation of the coronation of the Holy Virgin, accompanied by two angels, the whole in full relief, and made of silver gilt: the enamels are fine, and the casket ornamented with rock crystal, cut and set in coloured foil, has a remarkable effect. A bracelet of oxidised silver represents three children contending for some birds, which one of them is carrying off: M. Le Roi is the author of this beautiful design. Another bracelet in oxidised silver from the design of M. Masson, represents two Cupids playing amongst the stalks of the vine, and holding up a sapphire, with four pearls in the form of a claw—very finely chased, and in good taste. A small group, formed of irregular-shaped pearls, of two gentlemen in doublets fighting a duel with sword and dagger, has good action and distinctness of character, and is executed in a very pleasing manner: it serves for a paper-weight. The Jury also point out a large concave plate representing the triumph of Amphitrite, after a model by the late Wagner. A charming oval casket, the cover ornamented with a female figure reclining upon a panther, entirely in silver, after a model by Geoffrey de Chaume. A round table of cast silver, composed of a hollowed flat plate, in the centre of which is the front face of the head of a Naiad, surrounded by Titans and Naiads, with Hylas and a Nymph: the hollowed portion and the border are ornamented with heads, birds, and foliage, after models by the late Wagner: the leg of the table is formed of the stem of a reed and foliage, ornamented with a kingfisher: upon the three claws are the bird's nest attacked by a rat, and intoxicated infant Bacchantes, after the model of M. Geoffrey de Chaume, chased by M. Poux. The entire collection shown by this exhibitor appears to the Jury to be deserving of a Council Medal.

GUEYTON, A., 11 Rue Chapon, Paris (1619, France).—The variety of objects exhibited by M. Gueyton bespeak great fertility of invention and a felicitous

application of old as well as novel processes. The Jury would mention particularly the History of the Horse represented on seven medallions upon a cup of cast and chased silver of very good shape. A cup of cast silver, partially gilt, representing subjects of the chase, and having at the bottom a medallion of Diana of Fontainebleau. A perfume-burner, with a garland of oak intermingled with objects of inanimate nature, its lid formed of a vulture. An oblong casket, the sides encrusted with rubies, and the lid ornamented with the figure of a Grecian female adjusting her earrings, while a Cupid holds her mirror: this piece is in cast silver, and chased in a very artistic manner. Several boxes and cigar-cases, ornamented with handsome bas-reliefs, in cast and chased silver, very light, or produced by the electro process in silver and also in copper silvered. A beautiful bouquet in alto-relievo, made in copper, and also silvered, by the electro process. A group in cast silver of an Egyptian holding in a rearing horse, one-fourth the natural size. All these articles, especially those that are chased, and those produced by the electro process, pertaining at once to works of jewellery and of the silversmith's art, give M. Gueyton a very honourable position among the exhibitors, and have induced the Jury to recommend him for the Council Medal.

FROMENT-MEURICE, 52 Rue St. Honoré, Paris (1720, France).—The articles exhibited by M. Froment-Meurice consist entirely of gold and silversmith's work, trinkets, and jewellery, artistically treated. Among them are to be remarked two elegant brooches in the renaissance style, in rubies and opals, with brilliants arranged in the form of a fringe, one of them being very large, the other smaller. A beautiful bracelet in the same style, in blue enamel, gold, and brilliants. A brooch, in the shape of a cross, in black enamel, having a sapphire in its centre, with branches and garlands of brilliants, upon which is a bird with a body of pearl. The Pope's chalice, the ornamenting of which is at once elegant and novel, is executed with remarkable and appropriate taste. The toilet-table of Her Royal Highness the Duchess of Parma is a remarkable work, in which M. Froment-Meurice has overcome all the difficulties of the silversmith's and jeweller's art, in cast silver, *repoussé* work, enamelled and inlaid enamelled work, and engraved steel. But the attention of the Jury has been arrested by a centre-piece, representing Ceres, Bacchus, and Venus standing upon the terrestrial globe, which is encircled by the zodiac, and around which fly small figures in relief of the genii of Plenty, Music, and Concord. The globe is supported by male and female snake-footed giants, and rests upon a base decorated with ornaments and foliage. This piece, executed after models by M. Feuchère, is in style and execution such as in the estimation of the Jury merits a place in the first rank. It is entirely made in *repoussé* work, with the exception of the figures of the giants. It is sufficiently light to be easily portable; and the mounting is so arranged that the principal portions may be taken asunder with ease, without in any way affecting its solidity. For this article the Jury decided upon recommending M. Froment-Meurice for the Council Medal.

WAGNER, EMIL AUGUST ALBERT, Berlin (840, Prussia).—The Jury recommend for a Council Medal M. Wagner, the maker of a silver centre-piece for the table, having three stages one above another. The one forming the base consists of a plinth, supported by lions. Upon the plinth are represented figures of the human race in its primitive condition, seated and grouped at the foot of an oak tree, and

accompanied by animals and implements characteristic of the chase, of pastoral life, and of fishing. Above these, three female figures, standing against the pillar, represent Agriculture, Horticulture, and the cultivation of the vine. These figures support a bowl, the sides of which are formed in *repoussé* work, and ornamented with numerous figures of children or small genii of industry, the sciences, and the arts, gracefully grouped, and forming very animated compositions. From the centre of this bowl rises a palm-tree, surmounted by a winged figure, representing the genius of civilization, and the subduer of evil, which is typified by an expiring hydra. The whole of this piece, with the exception of the bas-relief of the bowl, is cast and chased: the composition is entirely M. Wagner's. The figures of the genius, and the three females standing against the pillar, have been modelled by Professor Fischer. The *repoussé* bas-relief of the bowl, which is not quite finished, is M. Wagner's own work. The Jury recognise in this centre-piece a fine style, an exalted character, excellent sculpture, and good effect. The most studious care, united to extreme skill, has guided the execution of the whole of this work, which is worthy of the high position held by the arts in Germany, and worthy of the Exhibition it adorns.

The King of Prussia's shield. (98 Main Avenue).—HIS ROYAL HIGHNESS THE PRINCE OF WALES exhibits a shield, presented to him by the King of Prussia upon the anniversary of his christening. His Majesty furnished the general plan of the work: the drawings for it were designed by the celebrated painter Cornelius, the architectural ornaments are by M. Stüler, the modellings by M. Fischer, the goldsmith's work by M. Hossaner, the *repoussé* by M. Mertens, and the engraving of the stones by M. Calandrelli. In the centre is the head of Christ in gold alto-relievo, in a round concave medallion bordered by a wreath of acanthus leaves, which stand out upon a circle of blue enamel, with golden stars, the whole upon a large Greek cross, which is covered with the following gilt bas-reliefs: Justice, beneath which is a round medallion of St. Mark, surrounded by four chrysoprases; Prayer, beneath which is St. Matthew; Religion, with St. Luke beneath; and Charity, beneath which is St. John. Between the arms of the cross are four bas-reliefs,—Moses striking the rock, the Lord's Supper, the fall of manna, and the baptism of Christ. Around this cross is a frieze of blue enamel, ornamented with vines, with peacocks, and foliage of palm-leaves. Between these enamels are cameos upon German onyx, representing the twelve Apostles. The next circle is composed of oval-shaped ornaments of white enamel, between which are green cinque-foils with golden pearls, the mounting of which is golden foliage upon a background of white enamel with small green leaves, around which is a twisted border. The large bas-relief which surrounds the shield represents the entry of Christ into Jerusalem, Judas betraying Christ to the Pharisees, the burial of Christ, the Resurrection, the descent of the Holy Ghost upon the apostles, and the birth of the Prince of Wales. Upon the next bas-relief is represented the arrival of the King of Prussia in England; his galley steered by angels, and propelled by a personification of steam; he is welcomed by St. George, and by an allegorical representation of the Thames, by the Duke of Wellington and Prince Albert. The exterior edge is decorated with interlacings of white and green enamel, with buttons of flowered glass. Lastly, the concave edge is ornamented with inlaid enamel-work, in the form of a garland of fruits, grapes, and ears of corn.

This shield, worthy of remark for its composition, and for the beauty of its sculpture, enamels, cameos, and fittings, merits, in the opinion of the Jury, a Council Medal, as a reward for the talent of the artists, who have executed the orders and carried out the idea of the King of Prussia.

SAZIKOFF, *IGNACE*, Moscow (366, Russia), exhibits several articles in silver, consisting of vases of varied and original forms executed with much care; of very elegant statuettes in cast silver, especially one of a female figure reclining upon the brink of a well, and looking at her image reflected in the water; the cylinder of the well is hollow, and gilt inside, forming, when reversed, a drinking cup: another work represents a female figure leaning against a cask and pouring out beer; a cat is shown climbing up the cask behind her: this piece forms a teapot, the cask serving to contain the liquid, the vase held by the female figure being the spout. These two compositions are perfectly original, and the workmanship is gracefully and carefully executed. The talent of M. Sazikoff is however especially displayed in a large centre-piece representing a fir-tree, at the foot of which the Grand Duke Dmitry Donskoy, sitting wounded, is learning from his soldiers that he has gained the victory. The composition of this group is excellent: the chasing possesses great fulness, and is, at the same time, most carefully executed: the figures, fine in composition and superior in execution, possess a great degree of originality, and are arranged in a natural manner; and the character as well as the merit displayed in this group place it above anything hitherto produced in this description of manufacture. The Jury recommended a Council Medal for M. Sazikoff.

KAEMMERER and ZEPTIGEN, St. Petersburg (376, Russia), Jewellers to the Imperial Court of Russia, have exhibited a diadem wreath in imitation of the leaves and fruit of the bryony. The leaves are in diamonds, and the fruits in emeralds cut in very elongated pear-shaped forms. The different portions of this wreath can be taken apart and used separately: 2,836 rose-diamonds, 129 brilliants, and 12 emeralds, are contained in this beautiful ornament. Next is to be observed a "berthe" formed of bouquets of currant-branches in diamonds, the fruit formed of polished uncut rubies suspended at different points upon a double string of diamonds, and arranged alternately with flowers in brilliants: its effect is excellent. The Jury have further remarked two other articles in the same collection, a bouquet of eglantine and lily of the valley entirely in brilliants and roses; also a brooch representing a branch of the ipomea in diamonds and beautiful turquoises. The importance of the articles in this collection, the superior taste in composition, and, above all, the perfection of the settings, not excelled by the works of any jeweller in the Exhibition, have induced the Jury to recommend that to Messrs. Kaemmerer and Zeptigen be awarded a Council Medal.

LEMONNIER, G., 6 Place Vendôme, Paris. (304).—The collection exhibited by M. Lemonnier has constantly and justly attracted considerable attention. The qualities which eminently distinguish the jewels belonging to the Queen of Spain are a very decided and elevated taste in the composition, an imposing effect, and great skill in giving effect to the materials at the disposal of the jeweller. M. Lemonnier has executed two sets of jewels for the Queen of Spain. The first consists of a diamond necklace in the form of a ribbon, interlaced with foliage of emeralds. The stomacher and shoulder-knots, from which are suspended very

large emeralds with clusters of brilliants, are in the same style, and in them the jeweller has overcome considerable difficulties presented by the design. The bouquet is formed of lilies of brilliants, the leaves of emeralds and ribbons of brilliants, with pendants of pearl. The crown is in the same style, with aiguillettes in the form of flowers having stamens in pearl. The bracelet is likewise a ribbon of brilliants, interlaced with emeralds. The whole of this collection displays, in the great harmony and simplicity of its arrangement, much adroitness on the part of its inventor in making use of a profusion of precious stones without allowing their immense number to mar the general effect. The same may be said of the set of jewels made in diamonds and sapphires, also belonging to the Queen of Spain. The crown is composed in the heraldic style: in the centre of the diamond flowers is a sapphire; a beautiful wreath of brilliants accompanies the crown, with which the stomacher and the necklace match perfectly; upon them are flowers of brilliants with centres of sapphires with garlands and long-shaped pendants. The whole of this set presents an *ensemble* worthy of the talent of M. Lemonnier. It is impossible to speak of other articles of secondary importance to those just described, though they would elsewhere be deserving of notice. M. Lemonnier has thoroughly attained the end which should be kept in view in the execution of jewellery, to strike and gratify both the eye and the imagination. As a setter of stones he is excelled by many other jewellers; in point of invention and decoration he stands unrivalled in the Exhibition. The Jury recommended him a Council Medal.

VITTOZ, G. T., 10 Rue des Filles du Calvaire, Paris. (1530).—The attention of the Jury has been attracted by the bronzes and the works in gilt bronze exhibited by M. Vittoz. They can only speak of the bronzes which are either wholly or partially gilt, to which they are limited by their instructions. They have observed a clock in gilt bronze, called the "three hours of the day;" it is ornamented with Cupids upon a cloud, and supported by a pedestal of white marble. The Cupids are in bronze, and the style of Louis XVI. is preserved with much taste and care in the execution. The same clock is exhibited in double the size. A console candelabrum, in the Louis XIV. style, entirely in gilt bronze, is composed of three rich volutes springing from the foot, and entwined with garlands of oak, the whole supporting branches of lilies and mallows. This article is executed in remarkably good style, and the gilding has an excellent effect. A bronze figure of a child, of the size of life, bearing a basket from which issue fruits, flowers, and branches, gilt, presents a rich *ensemble* by the contrast of the bronze with the gold, and is of excellent workmanship. The group of children in bronze, half the size of nature, carrying bunches of grapes and resting upon a rich stand in gilt bronze is, in the estimation of the Jury, the best piece in this collection, so distinguished by the choice of models taken for the most skilful artists, and for execution with a care which no other maker has surpassed; the whole of the gilding is effected by the electro process, and appears to be executed in the best manner. The articles noticed claim from the Jury a recommendation for a Council Medal.

MORATILLA, F., Madrid (261, Spain).—It is to be regretted that Spain, a country renowned for its works in precious metals adapted for the purposes of Divine worship, should have sent but one article of this description to the Exhibition.

The Jury have nevertheless seen, with satisfaction, the monstrance exhibited by M. Moratilla. This choice specimen of the silversmith's art stands about 6 feet 6 inches high: it is made of silver-gilt, in the florid style of the fifteenth century. At the base are four bas-reliefs in silver, representing the Lord's Supper, Christ bearing His Cross, the Garden of Olives, and the entry into Jerusalem. Upon the platform are four figures in silver of angels in the attitude of prayer, their faces turned towards the octagonal base of the monstrance, the shaft of which is ornamented with figures of the four evangelists in full relief beneath Gothic turrets. The monstrance itself is radiated in the form of a double wreath composed of vine branches, clusters, and brilliants. Surrounding it are fourteen stars or comets composed of brilliants, topazes, amethysts, and emeralds: the cross is composed of brilliants and amethysts. The *ensemble* of this large work presents a fine effect. The Jury have particularly remarked the regularity of adjustment of the various parts, so difficult to carry out properly in a work elongated in the form of a Gothic spire, and conceived in a style of architecture which demands this very regularity as an absolute condition of good execution. On these grounds the Jury proposed that a Council Medal should be awarded to M. Moratilla; which being refused by the Council of Chairmen, a Prize Medal was given.

PAILLARD, V., 8 Rue St. Claude au Marais, Paris (1713, France), exhibits some bronzes which the Jury have examined with a great deal of interest, especially a beautiful figure of a child, of the size of life, crowned with vine branches, and holding a rich candelabrum of gilt bronze. It rests upon a three-fronted pediment of gilt bronze, in Louis XIV.'s style which has a fine effect. A large clock with candelabra in gilt bronze, in the style of the latter part of the reign of Louis XIV. Two vases of porcelain, the backgrounds of which are of turquoise blue with rich mountings of gilt bronze, composed of a grooved moulding around the neck of the vase, handles formed of infantine vintagers climbing upon a volute: beneath are heads of chimeras, from which a garland proceeds to the centre of the vase. Lastly, a pair of candlesticks, in the style of Louis XV., with twisted stems, the feet ornamented with escutcheons. It is principally as an artist in gilt bronze for room decorations that M. Paillard has distinguished himself in the Exhibition; and it is on this account the Jury recommended him as deserving of a Council Medal, which having been refused by the Council of Chairmen, a Prize Medal was awarded.

The Jury award the Prize Medal to Messrs. WEST and SON, of Dublin (15), for their brooches and trinkets in gold, copied with much taste, yet not servilely, from the antique fibulae found in Ireland; also for their necklaces, in which they have turned the almost forgotten style of the mediæval age to very good account.

The Jury award the Prize Medal to LAMBERT and RAWLINGS, Coventry Street, London (102), for their carefully-executed, elegant, and novel silversmith's work,—in particular, for a round flattened vase, with a long neck and a lid, in the Oriental style, the body and the neck ornamented with leaves, with gilt veins, and gilt and gilded bunches of grapes: also, for a centre vase, melon-shaped and flattened, having a long neck, the divisions of the side and the neck ornamented with thistles in bas relief; the silver is of a beautiful dead brightness, which would appear to be very durable.

JOHN HARDMAN and Co., Mediæval Court, exhibit a rich collection of articles

for church use, in silver and in silver gilt, and enamelled. They have adopted the mediæval style. The workmanship is good, bold, and well defined. Two large closets contain the communion cups, croziers, monstrances, pyxes, and crucifixes; for which the Jury award them the Prize Medal. (Awarded a Council Medal by Jury of Class XXII.)

The jewellery and trinkets of ROWLANDS, C. and W., 146 Regent Street, London (118), are remarkable for their fine execution, particularly a blue enamel brooch with a large polished and uncut garnet, two beautiful bracelets, and a brilliant and emerald stomacher. A Prize Medal is awarded for the carefulness and elegance of their workmanship.

CRESWICK, T. J. and N., Sheffield (45), exhibit articles important in size and of good taste. They are of plated silver, plated by the old process of uniting the metals by heat: the edges and mountings are of silver. The Jury have remarked, among other things, some plain candelabra, one of them of antique form, one of the style of Louis XIV., and another of the style of Louis XV. The workmanship of their dish-covers, tea-pots, and trays, is as carefully executed as this style requires, and perfectly adapted for long use. The Jury award Messrs. Creswick the Prize Medal.

A Prize Medal is awarded to ANGELL, J., 10 Strand, London (111), for his enamelled articles: especially a ewer vase with silver ground, dotted with burnished embossings, and ornamented with turquoise-blue enamels; also another silver-gilt vase, with vine-shaped handle, and burnished and engraved medallions, with enamel ground of green and turquoise-blue and cobalt-blue: a gold bracelet, with a round medallion of gold, and turquoise-blue and red enamel, the chain of which is very beautiful, and another bracelet in the Elizabethan style in gold, brilliants, and light-blue enamel.

DIXON and SONS, Sheffield (38). These manufacturers have exhibited a collection of coffee and tea services made of Britannia metal, an imperfect imitation of silver, as are all the compounds used for that purpose; but the forms are as varied as they are well chosen, and might be very advantageously imitated for the same articles in silver; the workmanship is very good, and the Jury award the Prize Medal in consequence.

S. H. and D. GASS, 166 Regent Street, London (83), exhibit an article of jewellery in the renaissance style, representing the figure of Britannia, the face and hands of which are of silver, and the drapery of rubies and diamonds: it stands beneath a canopy supported by four columns of garnets, with pendants of pearl. The art with which these precious stones are mounted appears to the Jury to be deserving of the Prize Medal, which they award to Messrs. Gass for their skilful workmanship.

J. KEITH, 59 Britannia Terrace, City Road (121). The communion services exhibited by Mr. Keith are five in number, of silver gilt, and in the mediæval style, well engraved and enamelled. They are rewarded with a Prize Medal.

WATHERSTON and BROGDEN, 16 Henrietta Street, Covent Garden (105). The Jury have remarked as deserving of the Prize Medal a vase in the ancient style, entirely of gold, enamels, and precious stones. It is in the shape of a covered cup, surmounted by a group in gold, representing England, Scotland, and Ireland. The body is a cylindrical bas-relief in gold, unfinished, the subject of which is the

landing of the Romans, and the battle of Hastings. Upon the handles are the figures of St. George and St. Dunstan; beneath are two figures of Fame crowning the busts of Nelson, Wellington, Milton, Shakspeare, Newton, and Watt; and on the foot are the figures of Truth, Prudence, Industry, and Valour. The vase weighs 95 ounces; it is decorated with very varied ornaments in enamel, relieved by precious stones and diamond festoons.

J. B. DURHAM, 456 New Oxford Street. (Class XXI., 46.) Amongst the articles made of steel submitted to their examination, the Jury have remarked a beautiful chatelaine, entirely of wrought steel: it is composed of twelve pieces, adjusted with extreme care, and covered with faceted ornaments; several of the pieces, such as the étui, the key, the tablets, and the almanack, have required very long and skilful work, and twelve months were required to complete this chatelaine. It was made entirely in London, and not a single piece of it was stamped. The Jury award Mr. Durham the Prize Medal.

HEELEY and SONS, Mount Street, Birmingham. (Class XXII., 305.) The Jury likewise award the Prize Medal to these exhibitors for their chatelaines, purse-ornaments, and buckles, made entirely of steel, and of very perfect workmanship.

LEUCHARS, W., 38 Piccadilly, London. (Class XXIX., 44.) The silversmith's work in the dressing-cases of Mr. Leuchars is well made, elegant and solid. A lady's dressing-case of walnut wood, mounted in the mediæval style, with pierced silver fittings, is particularly to be remarked. The Jury award Mr. Leuchars the Prize Medal.

Capt. L. L. BOSCAWEN IBBETSON, Clifton House, Old Brompton (Class XXX., 323), has exhibited some very delicate objects, principally of natural history, botany, and entomology, which he has covered with a metallic coating, sufficiently thin to preserve their details, and of sufficient strength to admit of their being moulded in sand. The casts taken from objects thus prepared retain the exactness of the original, everything on which may be minutely traced by the aid of a magnifying glass. This process combines in its results economy of time and of expenditure with the most desirable accuracy. The Jury award the Prize Medal to its inventor.

E. S. MARSHALL, 31 John Street, Tottenham Court Road, London (104), exhibits a collection of gold leaf of all colours. The specimens are fourteen in number. This article is used in various departments of industry. The gold of the same exhibitor for the use of dentists has appeared to the Jury to combine all the desirable qualities of purity and malleability. Samples of platina, palladium, zinc, cadmium, and tin, in leaves of extreme thinness, show to how many different metals the processes of the goldbeater may be applied. The productions of Mr. Marshall combine all the conditions of evenness and perfection in the work. The Jury award him the Prize Medal.

WILD and ROBINSON, Oberstein (889, Prussia). The manufacture of articles in onyx and agate, in their natural state, or coloured of various hues by artificial processes, has become a large branch of industry at Oberstein. In the collection of Messrs. Wyld and Robinson are to be remarked two very beautiful flower-vases of black onyx, coloured with natural white veins; two large cups of red chalcedony, coloured; large square links of chalcedony, connected together without joints, and alternating in colours,—very curious as regards both the work

and the material; also a very beautiful snuff-box of green jasper. This remarkable manufacture claims at the hands of the Jury the Prize Medal.

BRAHMFELD and GUTRUF, Hamburg (54, Hamburg). A silver inkstand is exhibited by Messrs. Brahmfeld and Gutruf, in the shape of an oak, at the foot of which are a stag and a doe: near them are two trunks of trees, cut horizontally, serving for the ink-bottle and sand-box. This work, which is cast, is elegant and natural. The Jury award the Prize Medal.

G. F. HAULICK, Hanau (+13, Prussia), exhibits a carnation in brilliants and rubies, with gold mountings enamelled green. This may also be used as a pin for the hair. It is planted in a small vase of turquoise-blue enamel upon gold, with buttons of blue and red enamel, and gold lion's heads bearing garlands: the base is ornamented with green and red oval-shaped ornaments. The Prize Medal is awarded for the *ensemble* of this work.

STRUBE and SON, Leipzig (33, Saxony). A burnished silver vase, its body encircled by carnations, and containing a bouquet of fifteen silver flowers, executed with so much lightness that they appear as if they had been produced by the same process as artificial flowers. This bouquet is an original work of Messrs. Strube and Son, and the Jury deem it deserving of the Prize Medal.

THE ROYAL PRUSSIAN IRON FOUNDRY, Berlin (271, Prussia), has contributed a large vase and two candelabra of cast iron inlaid with silver. The vase represents Alexander's entry into Babylon, after Thorwaldsen; and the candelabra support groups of Amazons on horseback and on foot. Judging of these articles as specimens of inlaying with silver, they are deserving of the Prize Medal.

KELLER and Co., Oberstein (888, Prussia). The Jury award the Prize Medal to these exhibitors for their tea-service of coloured cornelian, consisting of two pots, a sugar-basin, twelve cups and saucers, twelve small plates, and twelve spoons: and for their jewel-cases in green moss-agate. The workmanship, the quality of these objects, and their unusual dimensions are worthy of attention and approbation.

A. DUTERTRE, Geneva (219, Switzerland). The watch-cases, some in enamel, some ornamented with gold and diamonds, and two engraved gold plates, have attracted the attention of the Jury, who admire the delicacy and correctness of their execution. The gold plates, one of which represents an incident in the life of William Tell, the other a tree with a landscape background, are engraved, with extreme precision and delicacy, by Mr. Fritz Kundert: the tree, in particular, is of workmanship which will bear the minutest examination with a magnifying-glass. The Jury award M. Dutertre the Prize Medal.

P. H. GRANDJEAN, Serrenoud, Chauxdefonds, Neuchâtel (+6, Switzerland), exhibits a gold plate upon which he has engraved, on a very small scale, a forest, which appears to be copied from an engraving by Kolbe. Its execution is as fine as it is perfect, and has been awarded a Prize Medal.

A. DUBOIS, Chauxdefonds, Neuchâtel (43, Switzerland). Another engraver, M. Dubois exhibits a gold plate, representing ornamental objects of fruit and flowers, placed upon a console table, supported by Atlases, the whole in the style of Lepautre, engraved so finely that the plate at the first glance resembles a photographic proof. The Jury award him the Prize Medal for this faultless work.

L. A. GOLAY, Seresche, Geneva (220), has exhibited a small souvenir pocket-book, with cover engraved on white and green enamelled gold, with two medallions upon enamel, one of which represents two Italian women playing with a child, and the other a landscape after Calame. The perfection of these enamels and their beautiful effect merit a Prize Medal.

J. BENNATI, Genoa (59). The Jury award the Prize Medal to M. Bennati, manufacturer of silver filigree work, for a statuette of Christopher Columbus discovering a part of the globe by lifting up a veil which covers it. Notwithstanding the boldness of the idea of executing such a subject in filigree, he has shown so much skill and taste in overcoming this difficulty, that his success is surprising, and attributable to the clever arrangement of imperceptible threads, imparting to the *ensemble* of the figure a form at once *indecisive* but correct.

J. LOLEO, Genoa (58, Sardinia). Another manufacturer of filigree, M. Loleo, has executed a column commemorative of the Exhibition, not very durable, but of very choice workmanship. The Jury attach more importance to the beautiful manufacture of trays, scent-boxes, *vide-poches*, sugar-basin with tray, cigar-cases, fans, baskets, and garlands for ladies' head-dresses, which are of perfect execution, of very good taste, and have been rewarded with a Prize Medal.

H. RATZERSDORFER, Vienna (577, Austria). M. Ratzersdorfer exhibits a toilet-glass, the frame of which is entirely of massive silver, richly decorated with various ornaments, and with numerous groups and single figures. This frame, of elaborate and choice workmanship, merits, in the opinion of the Jury, the Prize Medal.

D. ROMAIN, Rotterdam (104, Holland). The celebrated Dutch setters of precious stones are represented at the Exhibition by M. Romain alone, who has made a *stomacher*, consisting of a portrait painted in enamel and surrounded by a bouquet, capable of being divided into three parts, and very cleverly mounted in rose diamonds and pearls, for which a Prize Medal is awarded.

J. FALLOISE, Liège (384, Belgium). It is only a few years since the art of inlaying and damascening iron and copper has been revived in France, Spain, and Belgium. M. Falloise, of Liège, exhibits many different articles, to which he applies this description of decoration. Particularly worthy of remark are—a steel bracelet, with a bas-relief representing a Nereid in silver, with drapery of green and yellow shades of gold, mounted upon a dolphin, and standing out from the ground of inlaid steel in very high relief,—two covered cups of copper (*patinés*) inlaid with silver, in the Oriental style,—three vases in the Renaissance style, ornamented on the tray and the stem with flowers, foliage, birds, and masks, inlaid in silver, in relief and engraved,—a steel chalice, upon which are numerous tasteful ornaments in gold and silver, inlaid and engraved. These remarkable articles entitle their maker to the Prize Medal.

E. ZULOAGA, Madrid (264 and 264A, Spain). Don Zuloaga has exhibited arms, and a cover for a book, of iron and black oxidised steel, richly decorated with bas-reliefs and with damascened ornaments in gold and silver. The pistols, daggers, and sword are exactly of the same style as the book-cover: the latter, intended to contain a Castilian title of nobility, is ornamented on one side with figure-subjects, on the other side with escutcheons and devices. The old Spanish models have served for patterns to all these works, in which the sculp-

ture is deficient in grace and elegance, but its combination with a very beautiful damascening produces such a good effect that artists are already engaged in copying the articles exhibited by Don Zuloaga, to whom the Jury award a Prize Medal.

JAHN and BOLIN, St. Petersburg. (322 Russia.) The Jury award a Prize Medal to Messrs. Jahn and Bolin, of St. Petersburg, for their beautiful exhibition of jewellery, as rich as it is perfectly set. Those especially worthy of notice are—A sparkling diadem, containing 11 very beautiful opals, 67 rubies, 1,814 brilliants, and 1,712 roses,—a bracelet of turquoises and diamonds, and a brooch, in the shape of a knot, composed of 754 turquoises,—with a pair of earrings of small turquoises, 709 in number. The settings of these latter objects are almost invisible. The execution of the jewellery work cannot be better.

F. DURAND, 41 Rue du Bac, Paris. (1595 France.) A Prize Medal is awarded to M. Durand for a tea-service, consisting of seventeen pieces mounted in stages, forming a pile of silversmith's work, supporting four tea-pots, as many sugar-basins, cake-baskets, and milk-jugs, all in silver, partly oxidised. The silver tea-kettle is heated by a lamp. Around are four niches, with female figures; above the tap, between the niches, there are figures of syrens; in the lower niches there are other female figures. Small Triton Atlases support the milk-jugs. The trays are inlaid with enamel, gilt and ornamented: the whole of the ground is in *repoussé* work, and richly ornamented. The models of the figures have been made by M. Klagmann. M. Durand exhibits besides a table centre-piece of silver, with infantine figures representing the four seasons, water and wine, in the style of Louis XV.; and a racing-cup, with subjects relating to tournaments and carousals in silver gilt, ordered by the late Duke of Orleans.

ODIOT, —, 26 Rue Basse du Rempart, Paris. (1671 France.) The articles exhibited by M. Odiot consist of large and medium-sized pieces of silversmith's work in the English style, and of workmanship which this skilful silversmith deems best adapted to table-services. All the pieces are of silver, mostly cast, burnished, matted or engraved, and manufactured with care and solidity. The principal articles are—a large vase, with marine divinities, about 4 ft. 6 in. in height: the table-service of M. de la Biboussière, all the covers of which are richly ornamented with sculpture of animals or of inanimate nature: an Arabian coffee-pot, with its *singams* in burnished and gilt silver: a chestnut plate, representing a damask table-napkin: a coffee-pot and chocolate-pot ornamented with spiral groovings, burnished and beautifully executed: a table centre-piece, representing a wild boar at bay: a large candelabrum, with bacchanalian figures: fine specimens of knives, forks, and spoons, &c. The Jury award the Prize Medal to the exhibition of M. Odiot.

CHARLES CHRISTOFFE and Co., 56 Rue de Bondy, Paris. (1562 France.) Messrs. Christoffe and Co., who are licensed to work the patent of Mr. Elkington, exhibit a valuable collection of silversmith's work in copper electro-plated with silver, of all sizes. The principles laid down, as to articles of every-day use being made of electro-plate, are applicable to all the exhibitors who have had recourse to this process, and the Jury can make no exception in favour of Messrs. Christoffe. They award the Prize Medal to the ornamental articles only which these manufacturers exhibit, such as a centre-piece representing Cupids fishing with a net around a group of trunks of trees, and candelabra, in the same style, of agreeable and animated sculpture.

CONSTANT VALÈS, 161 Rue St. Martin, Paris. (707 France.) The Jury have noticed with satisfaction the artificial pearls exhibited by M. Constant Valès, who displays great skill in overcoming the difficulties of workmanship, and producing a superior imitation of natural pearls. They award to M. Constant Valès a Prize Medal.

BOUILLETTE, HYVELIN, and Co., 46 Rue St. Avoye, Paris. (1107 France.) The articles exhibited consist of beautiful artificial stones tastefully set, amongst which a stomacher in diamonds, pearls, and emeralds, is especially worthy of notice. These manufacturers make the materials themselves, and work for exportation. The Jury award them a Prize Medal.

TRUCHY, E., 18 Rue du Petit Lion St. Sauveur, Paris. (1045 France.) M. Truchy confines himself especially to the manufacture of imitation pearls, and makes remarkable imitations of those called black pearls, for which the Jury award him the Prize Medal.

F. DAFRIQUE, 8 Rue Jean-Jacques Rousseau, Paris, (1575 France) exhibits a collection of jewels, bracelets, chains, brooches, and especially of polychromic cameos, with metal and enamel ornaments,—a happy invention, well carried out, and for which the Jury award him a Prize Medal.

A. SAVARD, 22 Rue Saint-Gilles, Paris. (1476 France.) This exhibitor cultivates a peculiar branch of manufacture, that of plating gold on red copper. In order to obtain it cheaply, his plates undergo a very accurate process of stamping in steel matrices, which are engraved with great accuracy; and they come out so perfect that they only require to be put together, which M. Savard does with extreme skill. He exhibits miniature frames, bracelets, brooches, and the most delicate ornaments. The Jury award him a Prize Medal.

SAVARY and MOSBACH, 2 Rue Vaucanson, Paris. (368 France.) The imitation stones of Messrs. Savary and Mosbach comprise samples of various descriptions, executed as well as possible—especially their imitation diamonds. The emeralds, and particularly the sapphires, are hardly so perfect; but hitherto manufacturers have been unable to attain perfection in this description of stones. The settings are in very good taste, and very carefully executed. The Jury award them a Prize Medal.

F. A. THOURET, 31 Place de la Bourse, Paris. (1702 France.) M. Thouret exhibits various articles of silversmith's work in copper electro-plated: but the Jury exclusively notice among the productions of this manufacturer the objects of art obtained from antique models with great exactness by means of the electrotype process, such as the Cup of Fulda, and the one representing the Rape of the Sabines: perfectly clean moulds, taken in gelatine from the originals, have served to reproduce these charming models in copper deposited by electricity: the deposits are beautiful, and are silvered and gilt. The Jury have also remarked a beautiful cover for a primer, produced by the electro process, ornamented with subjects from the Old and New Testaments, with superimposed medallions. The Prize Medal is awarded to M. Thouret.

—AUCOC, sen., 6 Rue de la Paix, Paris. (1052 France.) The beautiful fittings for travelling cases, exhibited by M. Aucoc, containing very important articles of silver and silver-gilt worked in the English style, are worthy of particular notice, and have been awarded a Prize Medal.

LEROLLE, FRÈRES, 1 Rue de la Chaussée des Minimes, Paris. (1318 France.) The articles exhibited consist of bronzes, clocks, candelabra, groups and figures mostly gilt, and silvered in parts. Their display of articles is considerable, and nothing which they have sent has been made for the occasion. The Jury, though observing in the productions of Messrs. Lerolle Frères a certain degree of negligence of style, deem them nevertheless deserving of the Prize Medal.

MIROY, FRÈRES, 10 Rue d'Angoulême-du-Temple, Paris. (646 France.) A considerable assortment of decorative articles in zinc and alloys of common metals, bronzed, gilt, or silvered, constitutes the exhibition of Messrs. Miroy, Frères. This branch of industry places within the means of all classes, and at very low prices, ornaments of rich appearance, such as statuettes, candelabra, clocks, &c. &c.: the greater part of these figures are cast in reverse, the bronzing, gilding, and silvering, being obtained by the electro process, the effect of which is remarkable in this description of articles, wherein it is desirable to combine effect with economy. The Jury award them the Prize Medal.

V. P. BOYER, 38 Rue Saintonge, Paris. (70 France.) The Jury award the Prize Medal to M. Boyer for his bronze figures electro-gilt, in which the gold is very well employed, exhibiting fine, burnished, dead, yellow, and green gold in large surfaces, or in imitation of damascening.

A. LACARRIÈRE, 9 Rue Saint Elizabeth, Paris. (1284 France.) Amongst the imitations of precious metals there are two large candelabra in cast-iron, partly bronzed, and partly gilt with varnish, exhibited by M. Lacarrière. These candelabra, adapted for burning gas, of large size and very beautiful execution, are exceedingly good imitations. The same manufacturer exhibits beautiful gas-fittings well put together, gilt by the same process as the candelabra, adapted very skilfully to ornamental purposes, and to the conveying of the gas. The Jury award M. Lacarrière the Prize Medal.

F. VILLEMSSENS, 57 Rue Saint Avoye, Paris. (1707 France.) The principal gilt bronzes manufactured by M. Villemsens are a tabernacle, having enamels on the door and on the rose-work, in the Gothic style,—a ewer with tray, in which the carved work of the helmet and shield of Francis I. is introduced with great ability and judgment,—also two candelabra with branches, the bases of which are ornamented with the trophies of the Porte St. Denis, very ingeniously arranged and silvered. The Jury award the Prize Medal to this exhibitor.

P. POUSSIELGUE-RUSAND, 34 Rue Cassette, Paris. (1405 France.) By devoting himself exclusively to the manufacture of church-plate, M. Poussielgue-Rusand has become a master of this particular branch of art. He has availed himself of the best ancient and modern models: his large enamelled shrine, after designs of the Abbé Martin, has a very beautiful effect, with the exception of the small engraved medallions: he exhibits also a bronze ewer gilt and enamelled, and silvered croziers richly ornamented with carving and enamels. The Jury award him the Prize Medal.

P. J. LAHOCHÉ, 162 Palais National, Paris. (1287 France.) Among the articles exhibited by M. Lahoché, the Jury have remarked a dark blue porcelain clock, with mountings and Cupids in gilt bronze in the Louis XVI. style: a centre-piece for the table: a large oval basket of porcelain, of a light-blue ground, supported by Cupids with tails of fishes, and garlands having branches to hold

candles; also the two candelabra vases which accompany it; finally two dark-blue porcelain vases, with a very beautiful mounting in gilt bronze forming a garland. The Jury award this exhibitor the Prize Medal.

L. D. J. AUDOT, 81 Rue Richelieu, Paris. (11 France.) The beautiful fittings for the dressing-case of the Princess Wolkonski, manufactured by M. Audot, are of engraved silver, and of very good workmanship. The same exhibitor shows a very beautiful vase, with triple spout of reticulated silver highly finished of an interlaced form, the spout and handles gilt, with flowers and foliage in relief, and gilt in three colours. The fittings of another dressing-case are entirely of waved silver, inlaid with enamel and damascened, having a very good effect. These articles are deserving of the Prize Medal, which is awarded to M. Audot.

C. S. MATIFAT, 9 Rue de la Perle, Paris. (923 France.) As a manufacturer of gilt bronzes, M. Matifat has sought novel, varied, and elegant forms, and has been as careful in the execution as in the choice of his models. The Jury have remarked with pleasure the beautiful mounting of a large mosaic table: this mounting is entirely in gilt bronze, with heads of chimeras and lions' feet, of a solid design and very well chased. The clock, with a group of a female satyr and her child after Clodion, and the cup of old Sèvres, with modern painting and beautiful mounting of bronze gilt, are objects particularized as deserving of the Prize Medal. (Awarded a Council Medal by Jury of Class XXII.)

A. THOUMIN, 44 Boulevard Beaumarchais, Paris. (696 France.) The Jury award the Prize Medal to M. Thoumin for his stamped brass furniture ornaments. The rough patterns of the articles exhibited are placed in juxtaposition with the finished samples, in order that the precision of the stamping may be appreciated. The finished ornaments are lackered in a colour much resembling gold.

A. R. PAYEN, jun., 18 Boulevard Saint Denis, Paris. (1674 France.) The jewellery is intended for exportation, and composed with much taste. This exhibitor makes filigree work after the manner of the Indians, and employs to advantage numerous real pearls of small size. The Jury award a Prize Medal to the intelligent workmanship of M. Payen.

J. AUBANEL, 43 Rue de Trévise, Paris. (1055 France.) The articles exhibited by M. Aubanel consist of a rich chimney-piece in the Louis XIV style, in gilt bronze. The two ends are occupied with vases filled with fruit: a light and gracefully-outlined arcade is placed in the middle, and surmounts an oblong vase, whilst it supports another in the shape of a church lamp, from which issues a girandole for seventeen candles. All the vases are of "griotte" marble. The Jury, seeing much merit in this work, award M. Aubanel the Prize Medal.

LEVY, FRÈRES et Co., 76 Rue des Fossés du Temple, Paris. (595 France.) The workmanship of these exhibitors, without making pretensions to an elevated, is far above an ordinary character. They produce in their own manufactory all their gilt bronzes, which they use for the decoration of porcelain mounted by them with much propriety and richness. Turquoise-blue porcelain of subjects in the style of Watteau is exhibited; and the judicious manner in which it is mounted in highly-ornamented gilt bronze, deserves the Prize Medal awarded by the Jury.

A. WEYGAND, 108 Rue Vieille du Temple, Paris. (740 France.) The blue

porcelain vases, mounted with gilt bronze, representing Syrens, and the clock representing Agriculture, in gilt bronze and ivory, exhibited by M. Weygand, render him deserving of the Prize Medal. The work of these articles is generally in good taste: nevertheless the architecture of the pedestal of sea-green on which rests the statue of Agriculture, in itself presenting a beautiful combination of gold and ivory, is not satisfactory. The remainder of this collection contains some pretty figures in bronze, which the Jury regret it is not within their province to notice.

A. CARON, Passage de l'Opéra, Paris (1133 France), Gunsmith, exhibits pistols very richly silvered, gilt, and damascened. The Jury award M. Caron the Prize Medal for this portion of his collection.

MOUTIER LE PAGE, 11 Rue Richelieu, Paris. (1364 France.) The Jury award a Prize Medal to M. Moutier le Page for a hunting-knife, the hilt of which is ornamented with a pommel representing an heraldic shield emblazoned with a lion in red enamel, accompanied by savages in coloured gold, terminating in foliage of another kind of gold, and armed with golden clubs with silver points; the shield is surmounted by a steel helmet with a rich wreath and crest. This work is executed in gold of various colours, inlaid to a great depth on a steel core, and is a specimen of the application of jewellers' work to side-arms.

F. PRÉLAT, 41 Rue de la Ferme des Mathurins, Paris. (1681 France.) The arms exhibited, particularly the pistols, are embellished with gold damascening, and gilt relievo ornaments. The quality of his work entitles this exhibitor to a Prize Medal.

L. A. BRUNEAU, 40 Rue de Montmorency, Paris (1119 France), manufactures a variety of articles, such as flat purses, office-articles, boxes inlaid with enamel, pocket-companions, scent-bottles, cigar-cases, with representations of various subjects, cast, chased, and in *repoussé* work, or produced by the electro process. The execution is in keeping with all the objects, and M. Bruneau carries out with intelligence this eminently Parisian branch of commercial industry. The Jury award him a Prize Medal.

— LEFAUCHEUX, 37 Rue Vivienne, Paris. (1308 France.) The Jury award a Prize Medal for the beautiful gold mounting of a carbine; for a double-screw plate for a gun, ornamented with dogs, inlaid and sculptured in gold, after models by M. Lechesne; and for the fine galvanic gilding of his weapons.

— DESFONTAINES, of the house of LEROY et FILS, Palais National, Paris. (1186 France.) M. Desfontaines exhibits a clock and a set of ornaments for the chimney-piece, which present a novelty in the material employed for the sculptures. The bodies of the clock, and of the candelabra vases which accompany it, are of dark-blue porcelain: all the ornaments and fittings are executed in cast-iron, polished and damascened in gold. The clock is ornamented with a composition representing five knights struggling for the *oriflamme*, one of whom is unhorsed,—a very animated scene, and executed with talent. The candelabra vases are surmounted by a figure of St. Michael in armour, holding in his hand a drawn sword: on the handles are two knights combating with dragons; and the feet are formed of three lions, with bats' wings: this work, taken as a whole, the effect of which is highly satisfactory, must have presented great difficulties of execution, which M. Desfontaines has surmounted in a happy manner, while the

judicious employment of the gold relieves the harsh colour of the cast-iron. The Jury award the Prize Medal.

The Jury of Class XXIII. make HONOURABLE MENTION of the following Exhibitors, their several claims to which are indicated after their names:—

LISTER and SONS, Newcastle-upon-Tyne. (27.) Silver plate for tea and coffee-service: a brooch in blue enamel with fleur-de-lis.

REID and SONS, Newcastle-upon-Tyne. (3.) Silver plate for table service, and candelabra.

M. MCGREGOR, Perth. (46.) A ram's head richly ornamented.

RETTIE and SONS, Aberdeen. (24.) Bracelets of Aberdeen and Peterhead granites: Scotch jewellery.

MARSHALL and SONS, Edinburgh. (23.) Cup, chatelaine, and bracelets in gate-

CARTWRIGHT and HIRONS, Birmingham. (30.) Silver plate for the table.

E. and J. SEYMOUR, 40 Gerrard Street, Soho, London. (72.) Portraits upon enamel of the Queen and Prince Albert.

HENRYS and Co., 2 Budge Row, London. (131.) Imitations of diamonds, pearls, and precious stones.

E. MATTHEWS, 46 Berwick Street, Soho, London. (95.) The Royal Arms of England engraved upon brass on a background of tin, in imitation of enamel.

E. NASH, 30 Coppice Row, Clerkenwell, London. (86.) Snuff-boxes in dark tortoiseshell, inlaid with gold "de burgos" and "piqué."

W. MOTT, 36 Cheapside, London. (116.) Pencil-cases and pen-holders in various styles.

J. MAYER, 68 Lord Street, Liverpool. (14.) Blue enamelled gold brooch in the form of a knot of ribbon: a necklace in gold, formed of a chain-work of scales, with medallion with three emeralds and two brilliants.

S. WERTHEIMER, 35 Greek Street, Soho, London. (Class XXVI., 177.) A bronze casket, gilt, pierced, and stamped: an inkstand ornamented with slabs of painted china and with gilt mountings.

SMITH, NICHOLSON, and Co., Duke Street, Lincoln's Inn Fields, London. (110.) Silver flower-stand.

R. ATTENBOROUGH, 19 Piccadilly, London. (113.) A plain tea-set gilt in the inside: a set of spoons and forks in the style called the Paxton pattern: bracelets in the form of a cross, one of them in brilliants upon gold and dark-blue enamel, the other in rubies upon diamonds and turquoise-blue enamel.

W. BAIRD, 72 Argyle Street, Glasgow. (26.) Ram's head richly mounted, the ornaments being silver thistles.

H. WILKINSON and Co. Sheffield. (44.) Large pieces of silver plate and table ornaments.

WIDDOWSON and VEALE, 73 Strand, London. (100.) Rings mounted with fine stones: a bandeau of diamonds with an emerald in the centre: a green and red enamelled curb-chain necklace with pendants.

G. ANGELL, 51 Compton Street, Clerkenwell, London. (103.) Vases in the Etruscan style, of various shapes.

G. R. COLLIS, Church Street, Birmingham. (34.) Large silver waiters: tea-service gilt and hurnished in the inside and engraved on the sides: a large chocolate-pot with outline ornaments.

F. ALLEN, Birmingham. (Class XXII., 293.) Vases of red glass surrounded by filigree-work: bouquet of the same description of workmanship.

H. BUSS, 13 Great Newport Street, Leicester Square, London. (79.) A shield in enamel, representing the heraldic devices of the nations whose works are shown in the Exhibition.

MARTIN, BASKETT, and MARTIN, Cheltenham. (2.) A chatelaine in gold and turquoise-blue enamel: a watch of turquoise-blue enamel and brilliants, with a chain of gold and enamel of the same colour.

G. and S. WATERHOUSE, 25 Dame Street, Dublin. (20.) Brooches made from materials of Irish produce, and copied from the antiques of that country.

J. and F. BIDEN, 37 Cheapside, London. (51.) The engraving armorial bearings upon stones, for private and official seals.

C. GOODWIN. (64.) Bloodstone cup.

PHILLIPS BROTHERS, 31 Cockspur Street, London. (87.) Statuettes in oxidised silver: pins and fancy jewellery in gold and enamel.

G. W. ADAMS, Hosier Lane, London. (88.) Knives, forks, and spoons, of the pattern called Tudor.

MARSAUX and LEGRAND, 14 Rue de la Perle, Paris. (332.) Stamped yellow copper for furniture-decoration. (Awarded a Prize Medal by Jury of Class XXII.)

F. LAURENT, 5 Rue Chapon, Paris. (564.) Fittings for dressing-cases in waved silver. (Awarded a Prize Medal of Jury of Class XXIX.)

L. ROUVENAT, 62 Rue Hauteville, Paris. (1460.) Patterns of sword-hilts and mountings.

A. F. PICHARD, 26 Rue des Blancs Manteaux, Paris. (1388, France.) Imitation of gold and precious stones: brooches, bracelets, and flowers, made in imitation-diamonds with enamelled ribbon.

E. MAILLOT, 28 Rue Grenier, St. Lazare, Paris. (597, France.) Mountings for smelling-bottles.

J. B. MARCHANT, 57 Rue Richelieu, Paris. (607, France.) Chimney-ornaments in gilt and silvered bronze: military figures. (Awarded a Prize Medal by Jury of Class XXII.)

B. HOULLIER, 36 Rue de Cléry, Paris. (1628, France.) Damascene pistols inlaid with gold of various colours.

J. H. CORNILLON, 36 Rue du Temple, Paris. (93, France.) Scent-bottles for the toilette-table coated with copper by the electro process, and afterwards carved, engraved, and gilt.

DESJARDINS-LIEUX, 4 Passage St. Avoye, Paris. (1588, France.) Statuettes, bas-reliefs, and medals, in stamped silver and bronze.

DETOUCHE and HOUDIN, 158 and 160 Rue St. Martin, Paris. (1589 France.) Mountings of a large clock in gilt bronze, in the style of Louis XVI.

F. KIRSTEIN, Strasbourg. (281 France.) Deer in a forest, in *repoussé* silver.

JÜNGER JACOB, widow of, Hanau. (409 Prussia.) Samples of enamels.

M. GOLDSCHMIDT and SON, Frankfort-on-the-Maine. (20 Grand Duchy of Hesse.) Set of jewels in gold, green enamel, and brilliants.

B. SCHREGER, Darmstadt. (51 Grand Duchy of Hesse.) Jewellery in oxidised silver.

G. I. HOFFMANN, Dantzic. (440 Prussia.) Yellow amber necklaces.

L. BOLZAU, Lemgo, Principality of Lippe. Mountings for meerschaum pipes.

G. E. JANTZEN, Stolp. (205 Prussia.) Necklace, brooches, and articles for dressing-cases, in lemon-coloured amber.

L. GEISMAR and Co., Wiesbaden. (13 Nassau.) Brooches and lids for boxes, carved in ivory, with subjects of the chase. (Awarded a Prize Medal by Jury of Class XXVIII.)

WILLIAM BERGMANN, Warmbrunn, near Hirschberg, Silesia. (207 Prussia.) Brown rock-crystals cut.

C. WEBER, Mannheim. (325 Prussia.) A ring of Rhine pebble.

S. MERCIER, Geneva. (96 Switzerland.) Enamelled watch-cases. (Awarded a Prize Medal in Class Xb.)

J. F. BAUTTE and Co., Geneva. (236 Switzerland.) Paper-weight of enamelled gold, with mechanical singing-bird.

J. PATTON, Chauxdefonds, Neuchâtel. (44 Switzerland.) Plate of gold engraved with inscriptions in various characters.

H. GROHMANN, Prague. (576 Austria.) Bohemian garnets set in buttons; buckles, necklaces, smelling-bottles, and bracelets.

A. PORTELLI, Valletta, Malta. (23 Malta.) Filigree-work.

E. CRITIEN, Valletta, Malta. (24 Malta.) Filigree-work.

S. FALSON, Valletta, Malta. (25 Malta.) Filigree-work.

B. G. MAMEDE, Portugal. (1022 Portugal.) Set of amethysts in gold filigree-work, with earrings in the form of parasols placed one above another.

A. DE FRANCA, Portugal. (1022a to 1022c Portugal.) Snuff-box of silver, waved and engraved.

D'ALBERT DE LUYNES, *Reporter.*

Paris, November 1851.

CLASS XXIV.

REPORT ON GLASS

Jury.

LORD DE MAULEY, F.R.S., *Chairman and Reporter*, 21 St. James's Place.
 E. H. BALDOCK, M.P., *Deputy Chairman*, 5 Hyde Park Place.
 R. L. CHANCE, Glass Works, Birmingham; Glass Manufacturer.
 L. C. DUNCAN, United States; Barrister.
 JULES FRISON,* Belgium; Glass Manufacturer, Member of Chamber of Commerce at Charleroi.
 ROBERT ORNARD, 2 Crescent, Blackfriars; Merchant.
 EUGENE PELIGOT, France; Professor at Museum of Arts and Sciences; Member of the Central Jury.
 DR. SCHUELER, Zollverein; Mining Councillor.

* Professor JULES CHANDELON, Proxy for M. Frison.

Associates.

GEO. BONTemps, at Messrs. Chance and Co.'s, Birmingham; Glass Manufacturer.
 SIR DAVID BREWSTER, Principal of the University, St. Andrews. (Juror in Class X.)
 JOSEPH CHAYER, 24 St. Dunstan's Hill, Tower Street; Window Glass Dealer.
 ALFRED B. DANIELL, 18 Wigmore Street; Flint Glass Dealer.
 W. MORTLOCK, 18 Regent Street; Flint Glass Dealer.
 PHILIP PALMER, 118 St. Martin's Lane; Window Glass Dealer.
 JAMES POWELL, 16 Temple Street, Whitefriars; Flint Glass Manufacturer.
 ANDREW ROSS, 2 Featherstone Buildings, Holborn; Optician.
 WM. SWINBURNE, 93 Upper Thames Street; Plate and Crown Glass Manufacturer.
 CHAS. WINSTON, 3 Harcourt Buildings, Temple; Barrister.
 THOMAS WOOD, 19 Greek Street, Soho; Plate Glass Silverer.
 ERNEST ZUCCANI, Brick Lane, Spitalfields; Looking Glass Manufacturer.

THE limits to which the Reports of the Juries must necessarily be confined will admit of a very brief and cursory sketch only of the rise and progress of this manufacture.

Its origin is uncertain, and has been ascribed by some of the writers of antiquity to accident. Josephus claims the discovery for the Israelites; Pliny assigns it to the Phœnicians, and states that the first glass-houses were erected in Tyre, where the only staple of the manufacture existed for many ages. Herodotus and Theophrastus likewise confirm the fact of the use of glass having been known in the earliest periods of civilization, and of the establishment of works for its fabrication

in Egypt and Phœnicia, and even in India, where rock crystal was employed in its composition. It is mentioned in the book of Job, "Hast thou with him spread out the sky, which is strong, and as a molten looking-glass?" But possibly this expression may have been intended, in the original Hebrew, to refer to the metallic speculum.

The Egyptian philosophers had made chemistry their study, and attained to a very high degree of proficiency in that science. They involved it in the same mystery as they did their religious rites, and claimed for it from the people the same respect as for an institution of divine origin; and it is not surprising that they should have discovered in the prosecution of their researches, the simple process of vitrification, resulting from the action of intense heat upon siliceous particles, combined with alkaline salts; and that they should at once have perceived the facility of working the malleable substance thus produced, which possessed the quality of becoming hard and transparent as it gradually cooled.

This fact once established, their artistic skill with the aid of science could not fail of advancing another step, and of availing itself of the means of conveying form and colour to the shape, and of dealing with it for purposes of ornament and utility, as we see exhibited in the few beautiful remnants, which have been brought to light in the excavations of modern times.

The process of manufacture, detailed by Pliny in the curious and interesting chapter of his "Natural History," (lib. 36. c. 25,) appears to have been very much the same as that practised at the present time; and Sir Gardiner Wilkinson (vol. iii., page 89) gives the representation of two glass-blowers inflating a piece of molten metal, by means of hollow tubes; taken from a painting of Beni Hossan, executed during the reign of that monarch, who lived about 3,500 years ago, and adds, "That glass vases, if we may trust to the representations in the Theban paintings, are frequently shown to have been used for holding wine, as early as the Exodus, about 1,490 years before the Christian era." The remains of Alexander the Great are said by Suetonius and Strabo to have been delivered to Augustus, when he was in Egypt, in a glass case, in which Seleucus had deposited them after removing them from a golden urn.

This substance is supposed to have been used by Archimedes for scientific purposes, and an orb of glass is mentioned, as having been constructed by him, which gave rise to the epigram put into the mouth of Jupiter by Claudian—

Jupiter in parvo cum cerneret æthera vitro,
Risit, et ad superos talia dicta dedit.
Hucine mortalis progressa potentia cure;
Jam meus in fragili luditur orbe labor!
Jura poli, rerumque fidem, legesque virorum,
Ecce Syracusius transtulit arte Senex!

There is in the British Museum a perfect and beautiful goblet, excavated by Captain Layard from among the ruins of Nineveh. It has a name, probably that of the contemporary sovereign, or of the maker, engraved upon it; and from the characters employed, and the locality in which it was found, it is believed to be of a date not less recent than seven centuries before the Christian era, and is probably the most ancient piece of manufactured glass in existence. The Barberini, commonly known as the Portland Vase, likewise in the British Museum, and

broken a few years ago by a fool, or a madman, shows the perfection to which the art was carried at a somewhat later period.

The commercial intercourse of the Phœnicians and Egyptians with the islands of the Mediterranean, and with Etruria, extended to them, and even to more remote regions, the use of this material. But it was not till the reduction of Egypt imparted to the Romans a more intimate knowledge of the arts practised in the conquered country, that the use of glass became general in Italy, and formed a very important article of commerce.

In the reign of Tiberius, works for the manufacture of glass were first established in the neighbourhood of Rome, and many instances are given by the writers of the day of the estimation in which it was held, and of the enormous sums occasionally paid for vases, or goblets of that substance, which were preferred by many to those made of the precious metals. It was employed by them not merely as an article of luxury in their feasts, or as an ornament in their palaces; but it served to decorate their altars, and for a pious offering in the tombs of the dead. Many fragments have been found in the catacombs, showing it to have been used likewise by the early Christians in their places of worship.

How far glass entered into the common purposes of domestic economy does not clearly appear. But it has been described as having been employed in the construction of hollow columns in the theatres, in which lamps were placed for the purpose of illumination; it was likewise used for incrustation of the walls of apartments, instead of marble; and to this use the expression "*vitrea camera*," employed by Pliny, has been thought to apply, whilst some commentators have considered that expression as referring to windows. But there is no positive authority for the use of glazed windows, earlier than the close of the third century, when they are alluded to by Lactantius, who compares the researches of the mind with the operations of the eye, regarding external objects, "*per fenestras lucenti vitro, aut lapide speculâri obductas*." St. Jerome also mentions windows, formed of melted glass, cast into plates (A.D. 422).

A sheet of glass is said to have been found a few years ago in a window-frame at Pompeii, but the fact does not appear to be very well authenticated, and at all events, it can only be one of very rare occurrence. After the removal of the seat of Empire to Byzantium, the arts suffered amidst the disturbances and confusion which prevailed in Italy during the decline of the Western Empire. Constantine had assembled around him all that could tend to the cultivation of art, and the embellishment of his new city, and there still remain in the cabinets of our days some few specimens, showing the perfection to which the manufacture of glass was carried in his time, and that of his immediate successors.

Venice, according to her early writers, had been in possession of the art of glass-making almost as early as the foundation of the city itself. But the capture of Constantinople (1204), in which she took so great a part, and the extension of commerce which this event afforded her, induced her wealthy merchants to avail themselves of their increased relations with the east, for the improvement of their domestic manufactures.

As early as the beginning of the 13th century, glass had been a subject of special attention to the Venetian government, and was regarded by them with so much care, as to have been, according to Carlo Marino, "in ogni tempo consi-

derata dal governo. qual pupilla degli occhi suoi." The trade and manufacture of this article increased so rapidly as to require a large number of additional buildings for carrying it on, and great uneasiness was excited among the inhabitants, lest fire might accidentally occur among them. In 1291 they were in consequence removed from the city, and the island of Murano was assigned by the government for their reception. Considerable privileges were, at different times, accorded to the merchants of Murano, with the view of adding importance to their operations. A separate jurisdiction, independent of all the authorities of Venice, excepting the supreme council, was granted to them; and a *libro d'oro*, in which the most eminent members of their guild, or fraternity, were registered, placed them in a position equivalent to that of the nobles in a monarchical state. But, on the other hand, they were subject to very stringent regulations. They were prohibited, under severe penalties, extending to their families, and even to their relations, and involving the loss of life and property, from conveying to any foreign country the secrets of the manufacture, or the materials employed; or even from affording their own individual services, by which the competition of foreigners with the trade of Venice might be promoted. An immense trade in beads, imitations of pearls and of precious stones, was carried on with the coasts of Asia, and of Africa, and extended to India, and to China; and continues by means of the commercial intercourse of England with these countries to the present day.

The revival of art in Italy had a beneficial effect on the manufactures of Venice, and improved the design and the colours of her produce. Her mirrors, and her table-glass of variegated colours and spiral stems, her bottles and cups, obtained a very high reputation, and became the source from which the wants of Europe, Africa, and Asia continued for a time to be supplied.

But, in the 15th and 16th centuries, events occurred which greatly affected the prosperity of Venice. The passage to India and to China, round the Cape of Good Hope, and the discovery of America, changed the whole system of European commerce, and threw open to Portugal and to other states the advantages which Venice had almost exclusively enjoyed. England and Holland had forced their way into the Levant trade, up to that period monopolised by the Venetians and Genoese. The policy of Soliman, who, after the capture of Constantinople (1453), endeavoured to turn the commerce of the east into channels which he could control, or from which he could derive advantage; and the loss of Candia and of Cyprus, operated still further to the disadvantage of Venice. The mystery in which she involved all her transactions, and the severity of the fiscal arrangements, by which she endeavoured to preserve her monopoly, impeded her own progress; whilst her exclusive system excited a spirit of competition among her neighbours, which rendered them successful rivals; and her own commerce and manufactures, assailed and undermined in so many different quarters, were rapidly giving way.

Her trade in glass suffered with the rest; and Bohemia, Germany, France, the Netherlands, and England, derived advantage by the dissolution of the Venetian monopoly, by the improvement of their established manufactures, or by the introduction of a new process into their respective states; where, to this day, the works of the artists of Venice are still adopted as models of great beauty

and skill, inferior only to the still more perfect productions of ancient Greece and Rome.

Bohemia was the first to emancipate herself from a state of commercial dependence upon Venice, and to resort to her own resources for her supply. Her forests afforded fuel and potash in abundance; siler and lime of excellent quality were to be found in the immediate neighbourhood of her existing works, and probably led, in the first instance, to the introduction of an improved system into that country; giving the manufacture an impulse which, combined with skilful manipulation, caused it to make rapid progress in the peculiar qualities requisite in the art.

The Bohemian proprietors having no other means of obtaining a return for those resources, which abounded on their estates, were induced to support the manufacture by their own exertions, and even to embark in the trade themselves. They have thus been enabled to bring into the market a beautiful article of commerce, and to compete successfully with countries possessing larger capitals, but where a higher price is paid for labour, and where many of the substances used in the manufacture require to be imported. The Venetian origin of their craft shows itself to this day in the reticulated pattern, the Eastern forms, the taper stem, and the variety of colours. Their colours, and engraving, and imitations of precious stones are likewise very beautiful; but at the best, they are but an imitation of Venetian art.

Bohemian glass is a silicate of potash and lime, and has no lead in it. The manufacturers of that country make use of the same materials in the construction of the metal, whether employed for window-glass or mirrors; with this exception, however, that for the last 25 years they have been using sulphate of soda, instead of potash, for making common window-glass. The same combination of materials prevails generally throughout Germany.

The manufacture of glass had probably been introduced into France at the same date as into Germany, and had been practised for common purposes from the earliest centuries of our era. Both countries derived their knowledge of it from the Romans; or probably from their commercial intercourse with the East, improved by the Romans, and still farther advanced in quality and artistic ornamentation, adopted from the Venetians. But it was not till a later period that France sought to increase the supply of her own demands, by paying greater attention to her manufactures at home.

As early as the fourteenth century, her government, with the view of inducing persons of education and capital to enter into the business, had declared that occupation to be in nowise incompatible with the dignity of the aristocracy, and decreed that none but gentlemen should venture to engage in any of its branches; and, as late as the latter part of the seventeenth century, the glass-blower might be seen laying aside his cocked hat, dress-coat, and sword, to prepare for the performance of his daily work. Other important privileges were granted to the manufacturers, and confirmed by a Royal Charter of Incorporation. But as education and capital became more generally diffused, these exclusive privileges were found to be injurious to the prosecution of trade, and have from time to time been modified; they still, however, remain in sufficient force to have an injurious effect upon the operations of the manufacturer and the merchant, and the conve-

nience of the public. Privileges of this nature were no doubt intended for the promotion of trade, by holding out advantages to individuals disposed to apply their capital and industry in the pursuit. But the import duties, which afforded protection to the speculator, were likewise resorted to by the government, in order to assist the revenues of their states; and, whether a sort of patent right were conceded to the speculators, or import duties were imposed for the purpose of checking foreign competition, the result was the same, injury to the manufacturer, and inconvenience to the public. The fiscal regulations affecting glass in the reigns of James and Charles were of this character; and the excise and customs' duties in England, imposed at a later period, proved still more objectionable.

The first tax on glass was imposed 6 and 7 William and Mary, subjecting all glass wares manufactured in England, or imported from foreign ports, to a duty therein prescribed. It was shortly afterwards reduced to one-half; and in 10 and 11 William III., "it was totally repealed, being found to be vexatious, and troublesome in the levying and collecting, and of small advantage to the Crown, and, if continued, it would lessen the duty on coals employed in the manufacture, throw great numbers of poor out of work, and endanger the loss of a manufacture so beneficial to the kingdom."—*Parliamentary Reports*, 1835. In the latter part of the reign of George II. an attempt was made to renew the tax in a somewhat different form, but it was again found necessary to modify it. Several Acts were passed in the reign of George III., which not only added very considerably to the duties weighing upon the home manufacture, but likewise established regulations relating to the process of fabrication, the thickness and weight of the articles manufactured, and the powers and duties of the officers employed, which, in addition to the pressure of the tax, were particularly disadvantageous in a business "which necessarily depends for its success on the application of scientific principles to the various combinations of the materials, which are used, either as fluxes, or to form the basis of the product; and especially to the due regulation of heat, both as to its intensity, and duration." A uniform system of regulation, prescribed by Act of Parliament, and executed by officers, who, however well meaning, were generally ignorant of the details of the business, could not fail of being vexatious, and of operating to the detriment of the manufacturer.

The 6 George IV. extended the duty to Ireland, the immediate consequence of which was a great and general depression of the trade. The primary intention of the excise laws was to secure the due payment of the tax, and to establish checks both on the manufacturer and on the officers employed in levying the tax; but they likewise assisted one branch of the manufacture, at the expense of another. For instance, a severe restriction was imposed on the bottle and crown glass trade; the object of which restriction was to promote the use of flint-glass, which is prepared from much more costly materials, and was charged with a rate of duty much higher than that on bottle glass. The repeal of the excise laws removed the restriction, and was consequently more advantageous to the manufacturer of bottle and crown glass, than to the persons engaged in the manufacture of flint; as the former were thereby enabled to supply a much cheaper article than flint glass, for all those purposes in England to which this material is adapted; as is the case in those countries where excise regulations do not exist. The gobleterie on the Continent (including phials and small glasses) is usually made of crown-

glass, and is much cheaper than in England, where the pressure of the tax impeded the manufacture; so much so, that in many instances in England, bottle and crown glass were manufactured of such good quality, as to lead to the strong suspicion that their improvement must have been effected by the use of materials not authorized by law, and consequently not consistent with the protection, afforded by that law to the flint-glass trade. But there were other provisions of the statute equally injurious, and which led to evasions in the highest degree disadvantageous to the legal trader, as well as to the revenue.

The most considerable advance in duty took place in 1812, and the immediate effect on consumption was as follows:—The annual average quantity of glass of all kinds, made for home use during the three years, ending in 1812, was 413,414 cwts.; the average of the three following years, ending in 1815, was 264,931 cwts, showing a decrease of above 35 per cent in the quantity made. In the quantities retained for home use in 1793, when taxation was comparatively low, and in 1829, there was a decrease of 9,626 cwt., notwithstanding the great increase of population, and the advance of civilization made during the interval by all classes.

So much has been written on the subject of glass, that it would be merely a repetition of the able and interesting information given in the different Encyclopædias, and in the many treatises on the history and manufacture of glass, if in our Report we attempted to do more than briefly allude to the details of the manufacture. But it is important to bear in mind that the basis of all glass, at all times and in all countries, is the same—silica and alkali; two apparently opaque bodies, which by their fusion produce a transparent result.* The alkali acts as a flux, and facilitates the vitrification of the earthy particles, which separately are unvitriifiable; and gives to them a pliability, when hot, which admits of their being blown, wrought, extended, and even hammered. It is remarkable that the glass found by Mr. Layard at Nineveh, now in the British Museum, bears the marks of having been turned, a process seldom attempted by the modern artists, though the application of the grinding tool, fixed on a lathe, approaches to the practice.

To the silica and alkali other substances are added, for the purpose of facilitating the flux, and of purifying the metal, and imparting to it some peculiar quality or colour. Metallic oxides are employed for this purpose. The oxide of lead, in the form of minium, is principally used in flint-glass, and increases its brilliancy, the purity of its colour, and the power of its refraction. Manganese, formerly known as glass-makers' soap, is also in general use for the purpose of clearing the glass of all colouring matter. Its effect may probably be ascribed to the facility with which it gives up its oxygen, which combines with the colouring principles and destroys them. But very great care must be taken lest the remedy, applied for the removal of one description of defect, should give rise to others of an opposite character. The presence of too much alkali attracts humidity, and (to use the glass-makers' phrase) disposes it to sweat. It also diminishes the refractive power

* Where sand is used, it is found, on examination with a microscope, to consist chiefly of small rough, rock crystals, which, by the action of alkali and fire, are aggregated and purified.

of the glass, and when used in the state of undecomposed sulphate of soda, or potash, renders it opalescent. Lead in excess will produce equally bad effects: it will soften the substance of the glass, affect its clearness, and, in course of time, render the surface liable to be altered and decomposed. The importance of lead in this manufacture, whether in the form of litharge or of minium, which is obtained by oxidizing litharge, is so well understood in England, that very great attention is paid to its preparation, as well as to the quality of the lead: it is made an object of exclusive manufacture, and is one cause of the excellence of British flint glass.

Borax, white arsenic, and nitre, are also useful, and powerful agents when well applied; but danger may arise from the employment of arsenic in vessels intended for domestic use. Borax, or borate of soda, is too expensive to admit of its being employed for common purposes. It is, therefore, far from being generally adopted, and is applied rarely even to objects of great importance. It was formerly imported from India, being a product of Thibet, but in a very impure condition; and a better sort in the form of boracic acid is now supplied from the works which M. de Larderel has established at Monte Cerboli, near Volterra, in the Tuscan Maremma. Having ascertained the presence of large quantities of boracic acid in the district, he obtained a grant of land for a term of years from the Grand Duke, and immediately commenced operations. He began by diverting a stream to the spot where the boracic acid was found to abound; and after the water had become impregnated with the acid, it was allowed to flow on through pipes to large pans for the purpose of evaporation. Volcanic heat likewise prevails in the same district, and in order to avoid the expense of fuel, which M. Larderel found extremely high when he first undertook the works, he has availed himself of this volcanic agency; and conveyed the heat in tubes, so as to make it pass under the pans, by which means the evaporating process is effected, and the boracic acid remains in the pans.

Notwithstanding the facility afforded by this natural agent, the manufacturers complain of the high price of this substance, about 5*l.* 10*s.* the metrical quintal (205 English lbs.). The price is said to be regulated by a contract, made with some merchant at Leghorn; but it has the effect of excluding the material from the manufacture of glass for domestic purposes; and it is likewise to be observed that the Tuscan boracic acid, even at this price, contains nearly one-half its weight of water of crystallization; so that the glass manufacturer has to pay at the present day nearly 1*s.* per pound for the material in its available form as a flux. There are, also, other objections to its employment; for it is so extremely pungent, that, unless applied with great caution, it corrodes the pots, introduces alumine into the fused metal, or passes away through the pores of the vessel.

It is said that this material has been found in abundance on the western coast of America, in combination with lime, as borate of lime; which, if correct, will be of essential service in many branches of manufacture. It is described, for the first time, by the American mineralogist, Hayes, and has been called *Hayesine* from its discoverer. It is met with in the Peruvian province of Tarapaca, not far from the port of Iquique, in the same locality where the nitrate of soda, now so extensively exported to England, has been found. The borate of lime contains nearly 45 per cent. of boracic acid, combined with 19 per cent. of lime, and 35 per cent. of water, substances which cannot deteriorate its quality as a flux; whilst its moderate

price, white colour, and absence of any metallic oxide, render it well suited to the use of the glass crucible.

The first chemists in France, England, and Germany have directed their attention to the fabrication of glass. Experiments have been tried by practical working men, with great liberality and intelligence. But there are certain principles dependent upon science, according to which all operations connected with the art must be directed. It is to the accuracy and judgment exercised in adhering to these principles, in providing for the selection and application of the component substances, in determining their proportions, and securing their purity and quality, in the working of the metal, the construction of the furnaces and the pots, in the management of the fires, and the annealing process, that we must look for the production of a good composition, and for improvement in the art of glass-making.

The silice mostly used in England is sea sand, consisting chiefly of quartz. The finest qualities are obtained from Alum Bay, in the Isle of Wight, and from near Lynn, on the coast of Norfolk. Black flint, when raised to a red heat, and plunged in cold water, is frequently used, and probably gave the name to the species of glass, flint-glass, or crystal, to which it is most commonly applied.

The alkali used in this manufacture is either soda, or potash, which is preferred for the finest works in the condition of the carbonate, and is then called carbonate of potash, or pearl-ash, from which the carbonic acid is expelled by the heat of the process in fusing. Soda is used as dry carbonate of soda, when a more than ordinary degree of whiteness is required, as in plate-glass. It is also used in this state, in coloured glass. In window-glass (crown and sheet) soda is more generally used as a sulphate of soda.

Colour is imparted to glass by the application of the metallic oxides, and when it pervades the whole mass, is termed pot-metal, as distinguished from that to which the colour is applied in the form of enamel.—(See Coloured Glass.)

Cobalt produces blue.

Manganese produces violet.

Antimony produces yellow.

Precipitate of cassius, or gold, produces pink.

Uranium produces opaline-greenish colour.

Chromium produces green.

Copper produces ruby, or greenish blue, according to its degree of oxidation.

Copper with iron produces ruby, or green, according to the degree of oxidation of the copper.

Silver produces a pure and beautiful yellow; but only by staining the surface at the fire of a muffle.

These colours, however, will be modified, or even completely altered by different combinations of the metals, the degree of their oxidation, the greater or less degree of heat employed, the addition of vegetable carbonaceous matter, and other circumstances.

The manufacture of glass has been classed by the Commissioners under the following heads:—

- A. Window-glass, including :
 - 1. Crown-glass.
 - 2. Sheet.
 - 3. Blown plate, silvered or unsilvered.
 - 4. Coloured sheet, pot-metal, or flashed.
- B. Painted and other kinds of ornamented window-glass.
- C. Cast plate-glass.
 - Rough plate.
 - Pressed plate.
 - Rolled plate.
- D. Bottle-glass, including : Ordinary bottles.
 - Moulded bottles.
 - Medicinal bottles.
 - Water-pipes and tubing.
- E. Glass for chemical and philosophical purposes.
 - Matrass-retorts, &c., &c.
 - Water-pipes and tubing.
- F. Flint-glass, or crystal, with or without lead ; white, coloured, ornamented, for table-vases, &c., &c.
 - 1. Blown.
 - 2. Moulded and pressed.
 - 3. Cut and engraved.
 - 4. Reticulated and spun with a variety of colours ; incrusted, flashed, enamelled of all colours, opalescent, imitation of alabaster, gilt, platinised, silvered.
 - 5. Glass mosaic, millefiori, Aventurine and Venetian glass weights.
 - 6. Beads, imitation of pearls, &c.
 - 7. Chandeliers, candlesticks, apparatus for lamps.
- G. Optical glass, flint and crown.
 - 1. Rough discs of flint and crown, to make lenses for telescopes, microscopes, daguerreotype and calotype apparatus, &c.
 - 2. Flint and crown, blown, or cast in plates for the optician.
 - 3. Thin glass for microscopes.
 - 4. Refractive apparatus, prismatic lenses for lighthouses. (See also Class J.)

SECTION A.—*Window Glass, &c.*

It has been observed before, that some degree of uncertainty prevails respecting the period when this description of glass came into general use. It was at first regarded as an article of luxury and splendour ; and appears to have been introduced into the churches of France about the sixth century. Fortunatus of Poitiers, who was contemporary with Gregory of Tours, mentions it in his Latin poems, as doing honour to the bishops of his day, by whose care the churches had been thus supplied with light, and embellished.

According to Bede, artificers skilled in making glass were invited into England by Abbot Benedict, in the seventh century ; and the churches and monasteries of

Wearmouth and Yarrow were glazed and adorned by his care. Wilfrid, Bishop of Worcester, about the same time, took similar steps for substituting glass in lieu of the heavy shutters which were then in use ; and great astonishment was excited, and supernatural agency suspected, when the moon and stars were seen through a material which excluded the inclemency of the weather. York Cathedral was glazed about the same time ; and in the eleventh and twelfth centuries, when a great stimulus was given to the erection of religious edifices, glass was generally employed in the windows.

It appears to have been used but very sparingly in domestic architecture till a much later period, when it came to be gradually adopted in the residences of the wealthy. As late as the middle of the sixteenth century, it was recommended, in a survey of the Duke of Northumberland's estates, that the glass of the windows should be taken down and laid by in safety, during the absence of the Duke and his family, and be replaced on their return ; which would be attended with smaller cost than the repair rendered necessary by damage from weather or decay. In Ray's Itinerary, it is mentioned that in Scotland, even in 1661, the windows of ordinary houses were not glazed, and only those of the principal chambers of the King's palaces had glass ; the lower ones being supplied with shutters, to admit light and air at pleasure.

The use of the diamond, in glass-cutting, which only dates from the sixteenth century, greatly facilitated the manufacture.

There are two methods of making this description of glass :—

1. By the cylindrical process (sheet-glass).
2. By the effect of centrifugal force (crown-glass).

In the first, as soon as the fused metal is in a condition for working, a sufficient quantity is collected at the extremity of a pipe, and then lengthened by swinging, and blown at the same time, till it acquires the form of a hollow globe, or cylinder, open at one end, and adhering to the mouth of the tube at the other. The cylinder is then detached from the tube, the neck being cut off with a thread of hot glass, and one side of the cylinder is opened with a heated iron or diamond. After which, it is taken to the flattening kiln, in which it is heated to softness, and rubbed down, either upon a stone or upon a sheet of glass, called a *large*, by means of a block of wood, called a *polissoir*. The sheet, thus obtained, is then placed in an annealing kiln, and left there to cool gradually.

By the second operation, the glass collected at the end of the tube is made to assume the form of a flask, or rounded lump ; and then, by a rapid rotary motion, the centrifugal force causes it to acquire the shape of a large circular sheet, about 50 inches in diameter. The thickness of this glass is nearly equal throughout, except at the knot, or bullion, formed at the centre, where the rod, or tube was attached to the metal.

The cylindrical process is the only one referred to by the monk Theophilus, as being in use in his time, whose work, entitled "*Diversorum Artium Secretula*," was written about the end of the twelfth, or early in the thirteenth century.

This method was principally employed by the Venetians, and was found to possess the advantage of insuring uniformity of colour in coloured glasses, arising from the greater equality of their thickness. But as the demand for coloured

glass diminished, the employment of the cylinders was entirely superseded in France, England, and the North of Germany, by that made on the rotary principle. It continued, however, to prevail in Bohemia, into which country it had been introduced from Venice, and was carried to so great a degree of perfection that when a glass of large dimensions, and good colour, was required in France, it was imported from Bohemia. In fact, the circular plates formed by the second process, rarely exceeded 30 inches in diameter, and were of such unequal thickness that a square, exceeding 16 inches by 12, could not be cut from them.

This state of the manufacture continued till the beginning of the eighteenth century, when a French officer, struck with the superiority of the Bohemian glass, formed the project of introducing this method of fabrication into France. Monsieur Drolenvaux formed a company for this purpose, brought workmen from Bohemia, and established a manufactory at Lettenbach, on the borders of Lorraine and Alsace, in 1730. They carried on their works with so much success, that being unable to purchase the land, which belonged to the monastery of St. Querin, they took it on lease for 100 years, and it was designated as the Manufactory of St. Querin. From this commencement have sprung all the factories, working glass on the cylindrical principle, in the Lyonnais, in the North of France, in Belgium, and latterly in England.

The first workmen, brought over from Bohemia, had been induced to leave their country by the offer of high wages, and fearing a diminution of the advantages which they enjoyed, in the event of competition, they entered into a combination for confining the business exclusively to their own families. They constantly refused to allow strangers to be taken into the establishment in which they worked, or even to give them instruction; and if a master attempted to break through this regulation, the whole establishment would throw up their engagements, and leave him unprovided with workmen competent to carry on the business. They thus transmitted their occupation from father to son; and the names of Schmidt, Zeller, Theber, Walker, Stenger, Huy, Mayer, &c., employed in the manufactories of France, even at the present day, testify their German origin. A similar practice prevailed to a certain degree in England, where the glassmaker's trade is likewise a very exclusive one; and the benefit societies, of which the workmen frequently are members, render it exceedingly difficult for the masters, even if willing, to depart from ancient practice, and attempt amendments, which are looked upon by the workmen as prejudicial innovations. Another evil of a very serious nature has also arisen from this system of exclusion, which has been more particularly felt since the alteration of the excise and customs' duties. This measure, and the consequent reduction in the price of glass, have caused a great increase in the demand; and the supply of workmen in this country properly educated and trained for the nice and difficult process required of them, is so limited, that the manufacturers have found themselves unable to execute the orders, from want of hands competent to carry them into execution. Consequently, they have been obliged to resort to the Continent, and to bring over workmen to assist in the works; which can only be accomplished by means of increased expense in wages.

The great advantage of sheet glass, obtained by the cylindrical process, is that of affording plates of larger dimensions, and of avoiding the waste, arising from

the circular form of the crown tables, and from the knob, or bull's eye in the middle, where the metal was attached to the tube. But the surface is much less brilliant than that of crown-glass, and is more wavy and undulated.

The manufactories of glass in plates, in France, Belgium, and the north of Holland, where the style of building required panes of large size, were in consequence gradually abandoned; and towards the close of the last century, a manufactory of that description near Abbeville, in Normandy, one in Hanover, and two others near Aschaffenburg, and Bamberg, were the last in which this process in the construction of window glass was used.

Crown Glass.

In England, on the contrary, the manufacture of glass on tables, under the name of crown-glass, had attained to so great perfection in the quality of the metal, workmanship, size, and exterior appearance, that this glass was generally adopted in glazing windows of houses of superior description; whilst the material known as spread glass, or broad glass, formerly manufactured in England on the cylindrical principle, was of inferior quality; and reserved for the poorer description of habitations. It is true, however, that the English spread glass was not by any means so good, as the German glass made upon that principle. The surface was uneven, very rough, and defective in brilliancy; which rendered it less well adapted, than crown-glass, to the purposes to which the latter was applied in this country.

This served to prejudice the public against all glass made upon the cylindrical principle; and it was not until the year 1832 that the manufacture of cylinder or sheet glass was introduced into this country upon the principle generally adopted upon the Continent.

It was then introduced by Messrs. Chance and Hartley, of Smethwick, near Birmingham, whose attention was specially called to the advantages attending this mode of manufacture, by a visit paid in the year 1830 to the manufactory of M. Bontemps, of Choisy-le-Roi, near Paris. They were struck with the saving effected by the rectangular shape of the sheets of glass obtained by this process, and especially by the absence of the bull's eye or knot in the centre, which rendered it impracticable to obtain, out of the tables of crown-glass, panes of greater superficial measurement than about one-third of that of the tables themselves; whereas, in sheet glass, the panes could be obtained of the full size of the sheets blown, and the only limit to their dimensions was the strength of the workman; much greater facility being, moreover, afforded for accommodating the dimensions of the sheets to those of the frames required. Considering these advantages more than sufficient to counterbalance the disadvantage under which sheet-glass laboured in respect of evenness and brilliancy of surface, and taking into account the facility afforded by this process of manufacture for making glass shades (for covering clocks and other ornaments) which had hitherto been almost entirely imported from the Continent, and having secured the valuable co-operation of M. Bontemps, these gentlemen determined to commence the manufacture of sheet-glass, and started their first furnace in the autumn of 1832. They had, however, many difficulties to contend with, which it required all their energy and practical and commercial experience to overcome. The partnership was dissolved in 1836; and

the following year Mr. Hartley established a manufactory for crown-glass at Sunderland. Not the least of these difficulties was the excise duty upon window glass, which was at that time very heavy (amounting to at least three hundred per cent. upon the cost of the glass itself), and being levied upon all the glass manufactured, whether good or bad, much enhanced the cost of experiments; and had it not fortunately happened that some advantage was allowed, in the shape of drawback, upon that portion of the glass which was exported, this obstacle might have proved insurmountable.

The waviness of the surface of this glass proved, as was anticipated, a great obstacle to its introduction for general glazing purposes, excepting in such cases as those in which surface was of no moment, and strength the chief quality requisite; and it was not until the year 1838, when Messrs. Chance, Brothers, and Co. introduced a thicker description of sheet glass, which was at the same time of a better surface, that its use can fairly be said to have become general. Since that time further improvements have been made, and the manufacture has gradually been adopted by other crown-glass manufacturers; and since the removal of the excise duty it has extended to such a degree, that at the present time the weight of sheet-glass annually made is probably nearly equal to that of crown-glass, and it appears to be continually increasing. It is with this that the Crystal Palace was glazed at a very short notice.

The manufacture of broad or spread glass was continued for many years after the introduction of sheet glass, with which it was able to compete, in consequence of a difference in the rate of excise duty which was levied upon it; but this difference having been done away with in the year 1845, and the duty equalized with that upon sheet-glass, it could no longer sustain the competition, by reason of its inferior quality; and the manufacture was shortly after abandoned.

It was not so with the manufacture of glass shades, which, as before mentioned, was introduced at the same time, and by the same firm, as that of sheet glass, and which has kept pace with it, and increased to a very great extent; and it has likewise undergone much improvement in the quality. The shapes have been adapted to the taste of the English; and shades are now produced of a larger size than were ever made on the Continent, to the almost entire exclusion of those of foreign manufacture, with which this market was supplied until the year 1832.

In the year 1840 a new variety of window glass was introduced by Messrs. Chance, under the name of patent plate, which they obtained from sheet-glass by a new process of grinding and polishing. Many attempts had previously been made, both in this country and abroad, to attain this object; and small glasses for silvering purposes had long been manufactured in France and Germany by this means; but the great loss in thickness attending the process of grinding, hitherto adopted in those countries, which made it necessary to make use of sheet-glass of great thickness, and which, therefore, was necessarily limited in size, had hitherto proved an insurmountable obstacle to the production of any but thin and small plates, which were not suitable for glazing, and other purposes for which size and substance were requisite. By the invention of Mr. James Chance this obstacle was overcome; and it became practicable to manufacture plates of several degrees of thickness, and of sizes containing from 8 to 12 superficial feet. The surface of the glass obtained by this process, though not perfectly true, was very nearly so; and in

brilliancy it was unsurpassed even by cast plate. This glass, consequently, soon became a formidable rival to crown, sheet, and cast plate, for glazing and for many other purposes; and since the removal of the excise duty, in 1845, the manufacture has greatly extended.

This improved process has, within the last few years, been introduced into France by Messrs. Patoux and Co., of Aniche; and has been successfully established, though upon a comparatively limited scale.

In Germany the fabrication of blown glass, which was derived from Venice, has never been departed from, nor replaced by the use of cast plate. They are not, however, restricted to the production of the small glasses, known in the trade as the Nuremberg glasses, and they have reached the dimensions of 84 by 42 inches; some of which are shown in the Exhibition; but there is reason to believe that blown glasses of such large dimensions are both more difficult of manufacture and more costly than when cast. A large capital, however, is required for the latter process. The Belgian window glass has made very considerable progress, and enjoys a high reputation. A large quantity is made annually for exportation. M. Frison, of Dampreny, serving on this Jury, and Messrs. Bennert and Bivors, are carrying on business at their respective manufactories, on an extensive scale; and the quality of their products is highly appreciated.

SECTION B.

Painted, and other kinds of ornamented window glass have been assigned to this section, but will be reported on elsewhere.

SECTION C.—*Cast Plate, Rough Plate, Pressed Plate, Rolled, &c.*

Notwithstanding the encouragement afforded to the manufacturers of glass of these descriptions in France, their progress does not seem to have been very rapid, until the ministry of Colbert; when some French artists, who had been employed at Murano, and become thoroughly cognizant of the method of making blown plate glass adopted in the Venetian manufactories, conceived the project of introducing the art into their own country.

They were taken up and warmly supported by Colbert during his ministry, and established works at Tourlerville, near Cherbourg, in 1688, in a situation resembling that of Murano, as nearly as possible, which they imagined to be calculated to promote the success of the enterprise.

We owe to Abraham Thèvert, a working manufacturer, the process of casting the metal, fused in the glass pots, which has effected so great an improvement in this branch of the manufacture: he at once perceived the advantage to be derived from it in producing glasses of larger dimensions, and better construction. He made his proposals to the government; and obtaining a patent, established his works in the Faubourg St. Antoine, at Paris, but shortly afterwards removed to St. Gobain, in Picardy. There he and his associates had to contend with much opposition on the part of the old company of Tourlerville; but in 1695 they endeavoured to reconcile their differences by uniting under a common charter of incorporation. This step, however, did not produce the desired effect; and the company were reduced to the greatest distress, when a new association was formed

under the management of Antoine D'Agincourt, who laid the foundation of the magnificent establishment now existing there.

The company of St. Quirin, which had been the first to make sheet-glass on the cylindrical principle in France, was not backward in adopting the great improvement in the manufacture suggested by Thèvert; and combined the process of casting with their other works. Their lease from the Monks of St. Quirin expired in 1840, but long previous to that period they had taken the precaution of protecting themselves against the evils which might arise from the competition of a rival company at the expiration of their lease, and had formed another establishment at Cirey, in the neighbourhood of St. Quirin, which, after the lapse of the term, merged in their more recent establishment at Cirey.

The two great manufactories of St. Gobain and Cirey, for a time, continued in opposition to one another; but a new enterprise entering the lists against them, the two long-established companies, without actually forming a partnership, entered into an agreement for their mutual advantage, and used a common dépôt for the sale of their produce, and for regulating the price in the different markets.

Another company established works at Montluçon about three years ago; and has sent some of their glass to the Exhibition. Their recent establishment does not afford them a large stock from which to select the best produce, but the colour of their glass is good; and if they can sustain the difficulties of a commencement, there is every reason to hope that, with time and encouragement, they will not fall short of the high reputation which so deservedly attaches to this branch of manufacture in France.

The manufacturers of St. Gobain and Cirey have sent to the Exhibition three glasses of large dimensions (one of which is silvered, the others not so), pure in colour, excellent in structure, finish, and polish, and free from the globules and other defects which are so frequently met with in glass. In short, the produce of these manufactories, now exhibited, approaches as near to perfection in this branch of the manufacture as it can attain. They did not, however, reach their destination, until the time had elapsed which had been finally fixed by the Commissioners for the admission of objects claiming to compete for the Medals; and on learning that an uneasy feeling prevailed on the subject among those exhibitors who had sent in their glasses two months earlier, in accordance with the original directions of the Commissioners, and who contended that it would not be just that the French glasses, selected from a large store after the Directors had had the opportunity of examining those which had been so long in the Exhibition, should be placed on the same footing, the St. Gobain and Cirey exhibitors, with a moderation which did them honour, consented to withdraw from competition, and merely to exhibit their productions, without claiming the reward.

In England, plate-glass, for mirrors and coach windows, had been introduced for the first time by the second Duke of Buckingham, who brought over workmen from Venice, and established a manufactory at Lambeth, where the works were carried on with success. The great improvement which had taken place in the process, in France, and more particularly the important inventions of Thèvert, found their way to England; and the first manufactory for cast plate was established in 1773, at Ravenhead, near Prescot, in Lancashire, by a society of gentlemen, to whom a charter was granted, under the name of "The British Plate Glass Com-

pany," under which title they still enjoy a high reputation, though their firm, their capital, and their privileges, have undergone considerable alterations. When this company was first established, the only cast-plate manufactory was that in France, supported by the Government; and all the processes of grinding and polishing were done by hand labour. In 1788 this company ordered of Messrs. Boulton and Watt, of Birmingham, a steam-engine, which is believed to have been the second ever erected; and in the following year they commenced the machinery for grinding and polishing. They were thus the first to introduce machinery for bringing their work to perfection; and the example was followed by all the other companies. It is remarkable, that though many attempts have been made to improve the machinery, it remains, in all the manufactories, without any alteration of its principle. The glass produced by this company is tinged with a slightly-blue colour, which they attribute to the fact of their avoiding the use of the metallic oxides in their metal; and consider that this practice gives hardness, brilliancy, and transparency to their glass, and admits of a finer polish; and they assert, that their glass is not liable to the change of colour which occurs when arsenic, lead, or manganese are employed. The glass which is exhibited by this company is placed in the Nave.

The establishment at South Shields, founded by the Cooksons, in 1728, likewise added the process of casting to their existing works. A very considerable business is now carried on there by their successors, the Messrs. Swinburne, who have supplied several large glasses for the decoration of the Building, and point out one in the furniture department, marked in the Catalogue, No. 4, as a specimen of their manufacture. They have likewise exhibited a dome of opaque white glass, large tablets of glass, coloured in imitation of marble, and a great variety of other objects composed of plate glass.

The rough plate glass of Messrs. Hartley, of Sunderland, likewise belongs to this section. A great variety of articles are manufactured by them; but it is this useful product that they particularly specify as the object contributed by them to the Exhibition.

The Thames Plate Glass Company was established in 1835-6 at Blackwall, and have exhibited two glasses of very large dimensions.

Two others in Lancashire, and that at Smethwick, near Birmingham, have all been brought into existence within the last half-century, and considerably increased since the repeal of the excise laws. Their joint produce now exceeds two millions of square feet annually, which are used, first, in the shape of rough plates, for glazing, for roofing-in the railway stations, skylights, and other similar purposes; secondly, as polished glass, for shop windows, and large plates, for the windows of houses.

The process of casting is much the same as that employed by Thèvert; but where manual labour was formerly used in the grinding and polishing, the use of machinery now assists the operation, and has led to a diminution in the cost of production, and consequently to increased consumption.

SECTION D.—*Bottle Glass, Water Pipes, and Tubing.*

The manufacture of bottles is of very considerable importance, from the amount and value of its produce. In France alone, the trade is estimated at above

60 millions of bottles annually; and their value at more than half a million sterling. The earliest and one of the most important manufactories of this species of glass was established in 1294, at Quinquenonne, in Normandy.

The bottles used for the effervescing wines, and for containing certain acids, require very great care in their fabrication. In the former, it is necessary that the component parts should be thoroughly mixed, when the mass is in a state of fusion; and that the glass should be of equal thickness throughout, that in every part the bottle may be equally strong, and able to resist the pressure of the fixed air confined within.

The loss of bottles by hursting, in the champagne trade, is stated to amount to from 20 to 30 per cent; and a machine has been invented for testing their strength, which ought to be equal to bear the pressure of from 25 to 35 atmospheres. The price of bottles for this purpose is generally nearly double that for ordinary purposes.

In bottles intended to contain acids, care should be taken to combine chemically the alkali and the lime, so as not to incur the risk of their being acted upon by the acid, and subjected to decomposition.

SECTION E.—*Glass for Chemical and Philosophical Purposes.*

The glass to which this section refers, requires peculiar qualities, according to the purpose to which it is to be applied. Hardness, evaporation of the salts by a long-continued exposure to heat, but which cannot be effected without deteriorating the colour, are the most essential qualities for glass of this description; and will bring it under the heads, partly of bottle-glass, and partly of flint-glass.

Several other products, useful in the dairy, the farm, the garden, &c., may be referred to this section.

SECTION F.—*Flint Glass, or Crystal, with or without Lead.*

The glass comprised in this section is derived from the remotest antiquity. Among the excavations which have been made in Egypt, Greece, Italy, &c., are found fragments of blown glass, moulded, pressed, cut, engraved, mosaic, reticulated, &c., and adorned with cameos of the finest workmanship. Venice and Bohemia followed in the same branch, and were only surpassed by the substitution of a metallic oxide in the manufacture, and the production of a silicate of lead and potash, in lieu of the silicate of potash and lime to which they still adhere.

The first manufactory of flint-glass in England was established in the Savoy House, in the Strand, in 1552, and another in Crutched Friars; but it was not till long afterwards that the great improvements which have brought it to its present state of perfection, by the use of minium, or oxide of lead, and closed pots in the furnace, were introduced.

In 1635 Sir Robert Mansell obtained a patent for making glass of this description, in consideration of his undertaking to employ pit coal, instead of wood, in his furnaces. He was also granted, on the same grounds, the exclusive right of importing drinking-glasses of fine quality from Venice, which were not made in England till half a century later.

The use of coal was soon found to affect the colour of the metal; closed pots

were then used for the purpose of obviating the evil, but from their use arose another objection. The fusion did not take place in the closed pots so rapidly, as when the metal was more immediately exposed to the action of the fire. A larger supply of alkali was required to assist the fusion, and the colour was still affected. This led to the adoption of a metallic flux, and the oxide of lead was applied in as large quantities as the fusion would bear without an alteration of colour. This new process not only remedied the evil, but has been found to produce glass of the purest colour, most brilliant effect, and most perfect in quality of any yet made.

This method of fabrication was not so much required on the Continent as in England, wood being principally used as fuel in the furnaces. It was not till 1784 that the metallic oxide was introduced in a small factory at St. Clond. It was afterwards removed to Mont Cenis, near Autun, which possessed the advantage of coal in the neighbourhood, and was known as the glass-works of the Queen, and continued its works till 1827.

Another manufactory of crystal, or silicate of lead, using wood fuel and open pots was established in 1790, at St. Louis (Moselle). It has continued to carry on a very extensive business during the last thirty years, and only yields in importance to the glass works of Baccarat, which were purchased in 1816, by M. D'Artigues, whose works at Vonesch, near Namur, had become, by the Treaty of 1815, a part of the Belgian territory, and who preferred to carry on his business in his own country.

The coloured glasses of Bohemia, of which Count Harrach, Count Schaffgotsch, and others have exhibited very beautiful specimens, and their imitations in Germany, France, and England, are comprised in this section; and likewise the *mille fiori* style of work, adopted for making presse-papiers and other ornaments, and sold by hundreds of thousands, which by the extent of the trade, have become a very important branch of manufacture.

The description of glass referred to in this section sustains the high reputation which it has earned, and is ably supported in the Exhibition by the products exhibited by the Oslers, the Pellatts, the Powells, the Richardsons, and many other exhibitors. The American glass likewise is comprised in this section. It is a silicate of protoxide of lead, and is remarkable for the purity of its colour.

SECTION G.—*Optical Glass, Flint or Crown.*

The properties which are usually considered as constituting excellence in glass for ordinary purposes may easily be attained; but in glasses intended for optical instruments, and to be employed in the examination of objects so remote or so minute as to require the most undeviating accuracy, the difficulty of obtaining the metal sufficiently free from the defects to which glass is incident, had hitherto baffled every attempt to produce a lens, except of very small dimensions.

Purity, unchangeableness of colour, transparency, and a certain degree of refractive power may be obtained; but perfect uniformity in the structure of the glass, so as to render its composition absolutely homogeneous in all its parts, is not so easy to be accomplished; and it is precisely this quality which is the most indispensable in the manufacture of optical glass.

The great difficulty seems to occur in the difference of the specific gravity of the several constituents of the metal: some melt at a lower temperature, and sinking through the mixture, leave a streak or trail in descending; some evaporate or decompose in a heat required for the fusion of others; and different substances cool at different temperatures. Hence arise discoloration, sweating, threads, globules, striae, irregular crystallization, which cause irregular refraction by the interruption of the rays of light, and their deflection from the course which they ought to pursue.

The discovery of the achromatic telescope has been of the utmost importance in the science of astronomy. The first idea is due to Galileo; but Euler, in recent times, applying his mind to the investigation of the cause of frequent failure in the construction of the telescope, adverted to the perfection of the arrangement of the crystalline humours of the eye, bestowed by the bounty of Providence on man, which are so disposed as to provide for the variation in the different rays of light, and draw them to one focus; and he imagined that glasses of different media might, on the same principle, be so adapted to one another as to correct and regulate the dispersive powers of the different rays. But the experiment tried on his principle did not meet with the success which he had expected.

In 1753, John Dollond directed his attention to the same object; and, aided by the co-operation of Euler, and of Klingenstierna, the Swedish mathematician, he succeeded, after a long series of experiments, in discovering the due proportions of the curvatures of the two lenses, of which the object glass of the achromatic telescope is composed; the one being flint-glass (silicate of white lead and potash), the other crown, or plate (silicate of soda and lime), which, having different refractive and dispersive powers, may be so arranged, that while, by the combination of the two the rays are brought to a focus, the greater dispersion of the flint lens may be corrected by the less dispersive power of the plate; the one being negative, the other positive. "The refractive power of the glass bends the rays of light falling upon, or rather entering its surface, according to a certain law, in which it proceeds through the medium, while the glass is of the same kind. The same occurs again when the ray, having passed through the lens, arrives at the other surface and passes into air, the ratio here being the inverse of the former."—*Encyc. Met.*

Hence arises the importance of avoiding any variation in the media of which the glass is composed; as the slightest difference would act as a disturbing cause to the progress of the ray of light in its due course, derange the refraction, and distort the object.

After this principle was attained, Dollond, and the French and German opticians experienced extreme difficulty in procuring glass adapted to their purpose. The Academy of Sciences, at Paris, offered prizes in vain for this object. The celebrated chemists Macquer Ronx of St. Gobain, and Aunet of Langres, devoted their attention to it in vain; and even when procured, 3 to 3½ inches in diameter was the largest size they could obtain.

M. d'Artigues, one of the first manufacturers of crystal (flint-glass) in France, and who to his high reputation for practical skill, added that of scientific knowledge, equally failed, or produced insufficient results; and it remained for a man in no degree conversant with science, not a glassmaker by trade, nor distinguished

by education, but endowed with extraordinary energy, spirit of inquiry, and perseverance, to have the honour of arriving at the solution of the difficulty.

Guinand des Brenets, near Neufchatel, a workman in the clock and watch trade, who had been accustomed to the fusing of metals in the prosecution of his business, observing that in the ordinary process the waving and the threads, which are frequently to be seen in glass, were removed by stirring and thoroughly mixing the metal by means of an iron bar, applied the same process to flint-glass, and combining it with close attention to the structure, after many attempts made during his leisure hours, succeeded in producing flint-glass perfectly free from striae.

M. Utzschneider, of Munich, hearing the result of his experiments, on making further inquiry, proposed to him to join him and M. Frauenhoffer in their establishment at Munich: he accepted the offer; and one of the largest glasses resulting from their experiments, the diameter of which is 9 inches, is now in the observatory at Dorpat.

Guinand returned to his own country, but not being a glassmaker by profession, he prosecuted his researches only at intervals. He had discovered the principle; he had earned a well-merited reputation in the world of science, and promoted the researches of others; but the results of his experiments had not attained to certainty in practice, and he had not overcome the difficulties in the fabrication of crown-glass, which requires the same perfection, and the same dimensions as the corresponding flint.

In the latter years of his life, Guinand entered into communication with the Astronomical Society of London, and sent over some discs of flint-glass, of which Messrs. Dollond, Herschel, and Pearson made a favourable report. The largest of these glasses was 6 inches in diameter; and it is remarkable, that in England, which had supplied the Continent with flint-glass, a disc of 6 inches should have been regarded as a rarity.

Soon after, a Commission, composed of Messrs. Herschel, Faraday, Dollond, and Roget, was instructed to pursue the inquiry as to the manufacture of flint-glass. Mr. Faraday took the lead, both in his own laboratory and at the glass-works of Messrs. Pellatt, and could not fail of arriving at important conclusions. He changed the principle of fabrication, and produced a borate of lead of remarkable purity. The Lords of the Treasury had found it advisable to make a relaxation of the excise laws in favour of the Royal Society, or persons acting for scientific purposes under that body. But, notwithstanding this regulation, the interference of the officers, and the delay in obtaining the necessary licence, proved so onerous and inconvenient, as completely to shackle their proceedings, and preclude all attempt to improve by means of experiment; and the question as to the fabrication of flint-glass being actively pursued in France and Switzerland, the Commission ceased from its labours.

Shortly afterwards M. Guinand died, without leaving any information as to his process. But in Bavaria, the works in which he had taken part had been continued according to his system; and his wife and two sons had witnessed his experiments, and were desirous of availing themselves of their father's invention for their own advantage.

M. Bontemps, who had devoted much attention to the manufacture of glass

generally, and particularly of such as is required for optical purposes, was introduced by M. Lerebours, of Paris, to one of the sons of Guinand, who was endeavouring to sell his father's secret in England, or in France. He formed an association with him, but did not succeed in arriving at any good result. The treaty was broken; but M. Bontemps, satisfied of the correctness of the principle if properly applied, continued the experiments at his works without excluding Guinand; and in 1828 they succeeded in producing good flint-glass, and discs of from 12 to 14 inches, and a large quantity of smaller sizes. From that time the manufacture may be considered to have been established on a regular system.

The widow of Guinand and her other son set up works in Switzerland upon the father's principles, and were succeeded by M. Daguet, of Soleure, who has sent to the Exhibition some of his products of moderate size, and pure in colour (14—6 *et infra*); but they prove the difficulty of producing large discs, and confirm the belief, that there are even more impediments in fabricating crown-glass of large size, than in making good crystal. In order to render it free from impurity, it becomes more difficult of manufacture, more liable to tension, and to accidents. It requires a higher temperature. By increasing the facility of fusion, the disposition to attract humidity, or to sweat, is increased. In rendering it too hard, the risk of crystallization, and imperfect vitrification in cooling, is incurred.

The insecurity in which political events in France involved the persons engaged in industrial pursuits was experienced by M. Bontemps: he contended against it, however, till the year 1848; when, after attaining to a high degree of eminence, and receiving the decorations which are awarded in that country to distinguished merit, he was induced to retire from the difficulties and dissensions which prevailed around him, and to accept the invitation of Messrs. Chance, Brothers, and Co., to unite with them in the attempt to improve the quality, and extend the utility of this important branch of manufacture. They have succeeded in producing discs of extraordinary dimensions in flint of 29 inches in diameter, weighing 2 cwt., and of crown glass up to 20 inches. These discs appear to be pure in colour, good in structure, and exempt from those defects which tend to polarization of light, &c., and were considered by the Jury of Class X., Sir David Brewster, Sir John Herschel, Lord Wrottesley, and others, to be so important, that they invited Messrs. Chance to submit their disc of flint to the operation of grinding, finishing, and other processes, necessary in order to ascertain the uniformity of its density throughout.*

Mr. Ross, the celebrated optician of London, was the first to call attention to a defect, which may be detected by polarization of light; and there is no doubt that many failures, which had occurred previously, were to be attributed to the absence of this searching test. A glass, exceeding only the small diameter of six inches, undergoes the annealing process with difficulty, and is liable to cool at the surface more rapidly, than in the interior; and this tendency increases with the size, which renders the production of a disc of 29 inches a very remarkable work.

* Since the above was written this remarkable disc has been subjected to the tests required in order to prove its quality: and its merit has been so satisfactorily established as to justify the Jury of Class X. in recommending that a Council Medal be awarded to the manufacturers.

In this section are comprised the optical glasses of M. Maës, of Clichy, which have been distinguished by the award of a Council Medal (see p. 1172), and likewise the annular lenses and cylindric refractors, which are applied in the construction of lighthouses, according to the principle introduced by Augustin Fresnel. Buffon in the last century, and Sir David Brewster in our own times, had recognised the advantage resulting from the arrangement of lenses in separate pieces, having a common focus. Fresnel, without being aware of the exertions made by Sir David on the subject, submitted, in 1822, to the French Commission on Lighthouses, a plan for substituting along the coast lights on this principle, and introducing the refracting apparatus instead of the metallic reflectors then in use.

In 1834 Mr. Alan Stevenson was sent to France to compare the lenticular apparatus with the paraboloidal mirrors in use in our lighthouses, and to report on the comparative merits of the dioptric and catoptric systems. The result has been the gradual introduction of lights on Fresnel's principle into our lighthouses, under the direction of the Commissioners of Northern Lights, and Mr. Stevenson's superintendence. The Commissioners have exhibited in the North-western Gallery some small lights (we presume) as models of those in course of adoption.

Two sets of lights have likewise been constructed on a larger scale, of which one is exhibited by Messrs. Chance, another by Mr. Wilkins of London. The latter is an apparatus containing the fixed light, varied with flashes, invented by Fresnel. The glass of which it is constructed was made at St. Gobain, and wrought in Paris by M. Letourneau. It is white, and appears to be of good quality; and if it is found not to be liable to humidity, the colour is certainly much in its favour.

The apparatus contributed to the Exhibition by Messrs. Chance was constructed at their manufactory, under the superintendence of M. Tabouret, formerly employed in the department of the Ponts et Chaussées in France, who, after thirty years of practice under that Board, had accepted the invitation of Messrs. Chance to direct the manufacture of the dioptric lighthouse apparatus, which they were desirous of establishing at their works. They have exhibited a dioptric apparatus of the first order, with revolving lenses and catadioptric zones, constructed on the principle of Fresnel. The upper and lower parts of the apparatus consist of a series of prismatic rings, each of which reflects, at the internal surface of its base, the incident rays of light. The advantage of this mode of reflection over the ordinary system of opaque reflectors consists in its saving a considerable loss of light, and being less liable to imperfection of surface. The middle portion of the apparatus is refracting, and produces by its revolution a succession of flashes or blazes of light, which may enable the mariner to distinguish any particular lighthouse. The revolving part consists of eight annular lenses. Each of these lenses is composed of a number of concentric rings round a central lens, so as to produce all the refractive effect of a single solid lens of corresponding dimensions, but with less loss of light. A more perfect optical figure is moreover given to these compound lenses than to a single piece of glass, spherical aberration being in some measure corrected, and lenses of larger size may thus be formed than could otherwise be practicable. The glass used in the apparatus now in the course of adoption in the lighthouses on the coast of Scotland is made in France, and it has been alleged that it is liable to attract moisture or "sweat," and consequently to lose a portion

of its brightness. But the French manufacturers deny the charge; and when the judgment and care manifested in the execution of these important works are taken into consideration, a strong presumption is afforded that the Commissioners and Mr. Stevenson as yet find the French glass the best adapted for the purpose. But, supposing the contrary opinion to be correct, it only opens to the British manufacturer a fair field for competition, in which we have no doubt of his being successful. Messrs. Chance have acted upon this principle: they have made a first experiment with the view of promoting this branch of the manufacture of glass in England; but in order to avoid the defect of sweating, they have, perhaps, gone into the other extreme, and though the glass of their lights is good in quality, the measures taken to expel the salts in its composition, which render it liable to this objection, have affected the colour, and given it a green tint, which is considered by competent judges to be objectionable.

The question of lighthouses does not properly come within the scope of this Jury; but having been called upon to advert to the apparatus in the Exhibition, of which the glass forms so material a part, we cannot quit the subject without briefly noticing some of the progressive improvements which have taken place in this department of the public service. The first, or most magnificent work in modern times was the Tour de Corduan, founded in 1584 on an extensive reef at the mouth of the Garonne, but not finished till 1610. Wood and afterwards coal afforded the first light. In 1780, M. Lenoir was employed to substitute paraboloidal reflectors and lamps, and in 1822 the dioptric apparatus of Gressel was introduced.

The Eddystone, $9\frac{1}{4}$ miles from the Ram's Head, on the coast of Cornwall, was erected of timber by Winstanley in 1696-98, and washed away in 1703. It was rebuilt by Rudyard in 1706, and destroyed by fire in 1755. The present edifice was erected by Smeaton in 1757-59. Tallow candles were used in the first instance for the lights. In 1807 argand burners and paraboloidal reflectors of silvered copper were substituted.

The Bell Rock Lighthouse, commanding the line of approach to the Firths of Forth and Tay, constructed of stone by Mr. Robert Stevenson in 1807-10, is too well known, and reflects too much honour on his name to require any further notice.

The most remarkable work on the coast of Ireland is that of Carlingford, near Cranfield Point, erected in 1830.

The Skerryvore Rocks, about twelve miles south-west of Tyree, off the coast of Argyllshire, lying in the track of the shipping of Liverpool and of the Clyde, had long been regarded with dread by the mariners frequenting those seas. The extreme difficulty of the position, exposed to the unbroken force of the Atlantic Ocean, had alone deterred the Commissioners of Northern Lights from the attempt to place a light upon this dangerous spot; but in 1834 they caused the reef to be surveyed, and in 1838 Mr. Alan Stevenson, their engineer, inheriting his father's energy and scientific skill, commenced his operations on a site from which "nothing could be seen for miles around but white, foaming breakers, and nothing could be heard but howling winds and the lashing of the waves." His design was an adaptation of Smeaton's tower of the Eddystone to the peculiar situation, a circumstance with which he had to contend. He established a circular base 42

feet in diameter, rising in a solid mass of gneiss or granite, but diminishing in diameter to the height of 26 feet, and presenting an even, concave surface all around to the action of the waves. Immediately above this level the walls are 9.58 feet thick, diminishing in thickness as the tower rises to its highest elevation, where the walls are reduced to two feet in thickness, and the diameter to 16 feet. The tower is built of granite from the islands of Tyree and Mull, and its height from the base is 138 feet 6 inches. In the intervals left by the thickness of the walls are the stairs, a space for the necessary supply of stores, and a not uncomfortable habitation for the three attendants. The rest of the establishment, stores, &c., are kept at the depôt in the island of Tyree. The light of the Skerryvore is revolving, and is produced by the revolution of eight annular lenses around a central lamp, and belongs to the first order of dioptric lights in the system of Fresnels, and may be seen from a vessel's deck at a distance of 18 miles. An arrangement of apparatus of considerable importance has been suggested by Mr. Thomas Stevenson, whereby true lenticular action may be extended by the adoption of total reflection for that end. By this arrangement, combined with the use of spherical mirrors, he has been enabled to use all the light of a lamp, and he has therefore termed it a holophotal system. Much has been done of late by the English, the Scotch, and the Irish Boards for the improvement of the lighthouse system; but the interests of commerce and of humanity require that much more should be done, as the funds set apart for this object will permit, in order to afford still greater security to vessels approaching our coasts; and we trust that the British manufacturers will not be slow in availing themselves of the opportunity of supplying a material of the very best quality for this important object.

In a sketch of this nature, it is for obvious reasons extremely desirable to avoid anything like a comparison between the products of different countries or different individuals; but it manifestly comes within the scope of our duty to give a brief account of the rise, and present position of the principal establishments which have contributed their productions to the Exhibition; and to take a general view of the state of the manufacture in those countries, which have, at expense and inconvenience to themselves, entrusted their property to our care, and confided in our impartiality and justice in determining to the best of our ability their respective merits.

In the progress of this undertaking, we have felt an increasing sense of the importance of the subject, and of the responsibility arising out of the task. We have felt that the contributors might reasonably desire a more detailed description of the products which they have contributed to the Exhibition, and of the art to which they have applied their intellect, their resources, and their industry. But our limits are necessarily restricted within narrow bounds, and we fear that we have already trespassed upon the Commissioners and the public, further than the object, intended in calling for Reports from the Juries, fully justifies. But we must plead in our excuse the interest and importance of the subject—an interest which we have felt growing upon us as we proceeded; and though we are aware that the subject has frequently been well and ably treated, yet we trust that in pointing out some novelties and improvements in the art, to which recent practice has given rise, we shall obtain forgiveness for exceeding in some small

degree the limits assigned to us. In the remarks, which we feel ourselves called upon to make, it has been our most anxious desire not to wound the feelings of any exhibitor, still less to do him an injury in his trade by any observation of ours, applying to his work. We have endeavoured to confine ourselves to general principles, not to point out defects; but to leave it to the exhibitor to judge for himself, whether our principles are correct, and whether he has acted in accordance with them; and if not, to amend his practice, and entitle himself to commendation on some future occasion.

There are, however, points at issue to which it is extremely important to call the most serious attention of the manufacturer. A difference of opinion prevails as to the actual composition of glass, and this must be regarded as a difference of principle. A practical difference prevails, particularly in cast plate-glass, as to the finishing and polishing. By finishing is meant the process of rubbing away the roughness or marks occasionally left on the surface after grinding, which will always be perceptible if they are not carefully removed before the glass is polished; and will consequently deteriorate its quality.

Lastly, the question of price.

With respect to the first question—the composition of the metal—upon this must depend the merit of the glass, and consequently its value. The combination of as much brilliancy of refraction with as perfect purity of colour as can be obtained is the object desired.

By some manufacturers, purity of colour is sacrificed to brilliancy of refraction; by others, the reverse is the case. The real object, the *juste milieu*, can only be attained by a judicious selection and apportionment of the materials employed; and this can only be the result of careful experiments, and the study of the effect of various chemical combinations. The expulsion, or retention of the alkalis, the metallic oxide used, the amount of heat employed, and the annealing process, are very important considerations in determining this question.

In some descriptions of glass the defect of colour is less apparent than in others. In mirrors a greenish hue, or a dull, heavy appearance in the glass, cannot fail of imparting to the object reflected a portion of its colour and tone; and in proportion to the extent of the defect, deteriorating the merit of the glass. The French and the Belgians have paid great attention to this circumstance; and judging from the specimens of the Cirez and St. Gobain glass in the Exhibition, and of the Belgian glass, which we have likewise seen in the hands of persons who had not the opportunity of exhibiting them, we should say, that if these glasses maintain their present appearance, and do not exude moisture, a very great advance has been made in the art, and a very perfect article of manufacture attained.

In England, the long-continued pressure of taxation exercised its influence over this species of glass, which, in consequence of its high price, was not in very great demand until the removal of the evil enabled the manufacturer to reduce his price, and improve the quality of his glass. Glass for glazing windows has been employed, in this country, to a far greater extent than silvered glass for mirrors; and the defect in colour is not so much perceived in the transparent glass, as in the latter. We are likewise told that, since the diminution in price, which took place on the reduction of the duties, the demand for both silvered and

transparent plate glass has increased to so great a degree, that hands cannot be found to supply the wants of the public and that the consequence has been a less careful fabrication of the material, or rather a fabrication of an inferior article, at the lowest price possible. It has been stated, that the more perfect manufacture of the French and Belgian artists will not stand the test of time, and that deterioration will occur, both in colour and structure, by the decomposition of the alkalies used in the manufacture.

We reply, that we are informed the practice of the Cirez and St. Gobain manufacturers is, to keep a very large quantity of their glass in store, sometimes for many years together, and that they have never experienced deterioration, and consequently do not fear its occurrence through lapse of time; and that, though we may admit it may be both right and politic to supply the public with a low-priced article of inferior quality, we do not believe those manufacturers are consulting their own interest, who fabricate an important article in an inferior manner, and who exhibit products, calculated to attract the wealthy and the fastidious by the qualities of magnitude and beauty, but which, on inspection, are found liable to be charged with the defect of colour, of striae, of globules, of undulations, &c. We believe that success in trade, as well as the honour of excelling in manufacture, requires gradations in fabrication, suitable to the means and tastes of the different classes of purchasers; but that each gradation should be as good of its kind, as the nature of its process will admit of its being made.

With respect to the third question, that of price, it is of course, a most important question; and it is a most difficult one to answer. The Commissioners had the question under their consideration for a considerable time, and at last wisely determined not to meddle with it. It does not depend upon arbitrary regulation, but upon circumstances which are necessarily fluctuating. Capital, taxation, supply and demand, fashion, all more or less affect prices, and prevent them from being the real indicators of the intrinsic value of an article exposed for sale.

Having ventured to make these general observations, it only remains for us to state the principle upon which the award of Medals has been made, and the grounds upon which the Jury has decided in favour of the successful competitors. We trust that in what we have said, it will be believed that we have no other object in view than to act in accordance with our duty, and deliver our opinion faithfully, according to the best of our judgment; and in doing so, if we "just hint a fault," we do not "hesitate dislike." We are proud of our manufactures; we enter warmly into the interests of the persons engaged in their production. Perhaps we are over anxious for their success. But we see, and we see it with satisfaction, that the foreigners are making rapid advances; and are bringing their intelligence and their taste into competition with us. We see new and extensive fields, opening every day by the wisdom of Providence, for the application of our energies and our resources; and it becomes our duty, as well as our interest, not to be backward in the struggle. "Up and be doing, and God will prosper." His bounty has prospered us in a most abundant and astonishing degree; and, from the tiller of the soil, the manufacturer of her produce, to the fabricator of the most delicate work, it will be by our own fault if we cease to excel. On behalf of that art which is more particularly under our consideration, we

claim the exercise of increased energy and science. It is a manufacture for which the primary constituents are easily and cheaply supplied ; and it combines, in a remarkable degree, the purposes of utility, of comfort to all classes, and of decoration. It reflects the splendour of the palace, and the beauty of the toilet. It lends its aid to science, and conveys the power of vision into infinite space ; and, within the last few years, has enabled the astronomer to detect, in the obscurity of their remoteness, planets on which the eye of man had never rested before ; and likewise, by its aid, amid the ruins of a former creation countless millions of animalculæ may be observed through the microscope in the oolitic formations of our globe. It imparts comfort alike to the rich and the poor, by the admission of the bright rays of the sun into their abodes, and the exclusion of the inclemency of the weather. It assists the sight of declining years, and enables the aged man to seek comfort in his Bible, and impart its Divine truths to his family. It directs the seaman in his midnight course, warning him of danger, and cheering him by the prospect of security, and home.

In drawing up the foregoing Report, information has been most liberally supplied, of the advantage of which the Reporter is fully sensible, and he begs leave to return his warmest thanks to John Wood, Esq., Chairman of the Inland Revenue Board ; to M. Bontemps, and Charles Winston, Esq., for their valuable assistance and advice ; to Sir David Brewster, and Mr. Ross, more particularly for that which relates to the question of the structure of glass for optical purposes ; and to Messrs. Zucani, Wood, Pellatt, and others, for the information which they have so readily given. The highly-interesting articles in Lardner's Cabinet Cyclopædia, in the Encyclopædia Britannica, and Metropolitana, and in M. Labarté's work on the collection of Debruge Dumenil, have supplied very valuable information, and will amply repay the trouble of referring to them ; and the Reporter cannot conclude without taking leave of the English and Foreign Associates in the Jury, over which he has had the honour to preside ; and affording his testimony to the zeal and intelligence which they have manifested in the discharge of the duties which they have been invited to undertake ; and without expressing his satisfaction in witnessing the cordiality with which Foreigners and Englishmen have acted together ; and though differing in habits and opinions, and urging those opinions with acuteness and with earnestness, have gracefully conceded, where they failed in persuading the majority ; and he begs them to accept his sincere thanks for their able support, and their courtesy, kindness, and indulgence to himself in the discharge of their mutual duties.

AWARD OF THE MEDALS.

The Instructions of the Executive Committee are understood by the Jury to be to this effect :—

No question of nationality is to affect the judgment of the Jury.

No comparison of the respective merits of exhibitors is to be made. In recommending for the Council Medal, and in awarding the Prize Medal at the disposal of the Juries, the merit of the article exhibited, simply, is to be regarded.

Where an exhibitor is a member of a Jury, he cannot compete for any Medal. But the Jury think themselves justified in adverting in their Report to the merits of the object which a Juror may have exhibited ; and likewise in mentioning

favourably those works, which are not of sufficient importance to lay claim to a Medal.

Excellence in manufacture, being, in other words, a mere difference in degree of merit between subjects, included in the same Class cannot be rewarded with a Council Medal without a deviation from the principles laid down by the Commission. Novelty of invention, or adaptation, or peculiarity in the mode of manufacture, if deemed of sufficient importance, may entitle to the reward of a Council Medal.

It is important that the exhibitors, as well as the Jury, should keep the principle involved in these Instructions clearly in view; because it cannot but appear at first sight to be an anomaly, to withhold from objects of importance or value a Council Medal, while this distinction is recommended for products, which, if not inferior in importance, beauty, or utility, are at least attended with infinitely less expense and risk in the manufacture. But the instructions of the Commissioners are so stringent on this point, as to relieve the Jury from all doubt upon the subject.

In Class XXIV. these observations apply particularly to plate-glass, and to crystal, in the fabrication of which there can be no material novelty, though beauty and merit of a high order may be obtained. But unless novelty, or extraordinary merit as works of art can be shown, these sections cannot claim the highest distinction.

In the case of Messrs. OSLER, of Birmingham, the Jury thought they were justified in recommending them for a Council Medal, in consequence of the general merit of the works exhibited by them, and a novel application of the art in the crystal fountain, placed in the centre of the Nave, which is good as a specimen of manufacture, more particularly when the magnitude of the pieces of which it is composed, and difficulty of execution, are taken into account; and though possibly the architectural design may be capable of improvement, yet there is no doubt of its being a work of great beauty, and of its adding very materially to the brilliancy, and general effect in the conspicuous part of the Building in which it is placed. But the opinion of the Jury was overruled by the Council of Chairmen, and the Council Medal withheld.

The Building itself, its magnitude, and brilliant effect, which have obtained for it the denomination of the Crystal Palace, render it the first and principal object of admiration.

The material, which forms so important a feature of the structure, brings it in some measure within the scope of our Jury, and we avail ourselves of the opportunity to express our high sense of the merit of Mr. PAXTON, who suggested, and of Messrs. FOX, HENDERSON, and Co., who have carried into execution a work, so well adapted for the object for which it was intended; so honourable to the ability, enterprise, and industry of British artizans, and of so much brilliancy in itself; and we heartily concur in the award, which has been made in favour of these gentlemen.

A Council Medal has been awarded, on the recommendation of the Jury, to M. MAËS, of Clichy, near Paris, for the reasons assigned in their Report, viz., the application of a novel chemical combination in the manufacture of lenses for optical purposes, by means of which glass, remarkable for its purity, brilliancy

and beauty has been produced, and exhibited by him. He claims the merit of novelty in the use of barytes, of magnesia, and of oxyde of zinc, in combination with boracic acid, which facilitates their fusion and easy vitrification. This facility is of great importance, particularly in glass intended for optical purposes; as it tends to the more perfect commingling of the substances employed in the construction of the metal; and consequently to render it more homogeneous, and free from striae, bubbles, and other defects peculiarly injurious to glass of this description. It is true that this glass has not stood the test of time; and that the borax, required for its production is extremely expensive, and liable to other objections;* but novelty is the principle insisted upon by the Commissioners, and the experiment, as far as it has been tried, has been eminently successful in the production of glass of remarkable brightness and purity; and the object in view being one of great importance, the Jury have viewed with satisfaction this first step made by M. Maës at considerable expense and risk to himself; and in the hope that it may lead to important results, they have thought themselves justified in recommending him to the Council for the award of a Council Medal.

M. Maës has likewise exhibited some very beautiful specimens of coloured, and other ornamental glass.

The name of CHANCE occurs so frequently in the preceding observations, and is so honourably connected with every branch of the manufacture, that we cannot but regret that, according to the regulations laid down by the Commissioners, their firm is precluded from entering into competition for the Medals by the fact of one of the partners having consented to act as a Member of our Jury. But though Mr. R. I. Chance is thus disqualified by his own act, he has entitled himself still more to the consideration of the Jury by the valuable assistance which his practical experience, and intimate knowledge of the details of the subjects committed to our investigation, have enabled him to afford.

When we witness the magnitude, and variety of the operations undertaken by this firm, the merit of their works, the liberality, intelligence, and spirit of enterprise, which they have manifested at great cost and risk in experiments, tried for the purpose of introducing into this country branches of manufacture almost exclusively practised by continental enterprise—when we consider the advantage of inducing men, as eminent in their occupation as M. Bontemps and M. Tabouret, to settle in this country, and superintend our works—we feel that we should not act with justice by Messrs. Chance, or do our duty by the Commissioners and the public, if we did not call their attention, in a special manner, to the merits of the firm.

In addition to the improvement effected by Messrs. Chance, in crown or sheet glass, and the introduction of their patent plate in the market, they have also exhibited specimens of coloured window-glass, of painted windows, of glass shades made by the application of machinery, and far exceeding the dimensions of any similar work of this description hitherto attempted, and glass for optical purposes, described in the section to which that substance is referred.

* The facility with which boracic acid fuses earthy particles is so great, that if not used with much caution, it acts upon the earthen pots, and conveys alumina into the metal, when in a state of fusion.

They also exhibit some extremely thin glass, 200 to 300 to the inch, for purposes connected with the use of the microscope, and for experiments relating to the polarization of light, the want of which had formerly been found to be a great disadvantage in researches of this nature. This thin glass was introduced by Messrs. Chance as far back as the year 1840; and the Jury were informed by Mr. Ross, that by its use microscopes were made of very far higher power, than could otherwise have been produced.

M. JULES FRISON, of Dampresny, near Charleroi, being a member of the Jury, is likewise disqualified from entering into competition for the Medals. He is sole proprietor of the manufactory, and carries on an extensive business; the larger part of his produce being made for exportation. He has sent to the Exhibition sheet window glass of very good quality, well blown, well flattened, with a very good surface, and free from fire-specks and scratches. He has also contributed some good glass, obscured by mechanical process; likewise some fluted glass.

SECTION B.

In the classification of objects exhibited, which has been delivered by order of the Commissioners to the Jurors for their instruction in determining the merits of the articles contained in each class, "painted and other kinds of window glass" are referred, in Section B, to the Jury appointed to consider and report upon Class XXIV., and they proceed, accordingly, to discharge the duty assigned to them by delivering their opinion in the subjoined Report.

But the Medals having been awarded by the Jury of Class XXX. to the exhibitors of the objects referred to in this section of Class XXIV., we shall confine our Report to the statement of what we consider to be the principles of this branch of the manufacture of glass, and the use which the exhibitors appear to us to have made of it.

GLASS PAINTINGS.

Of the glass paintings, displayed in the Exhibition, there are some whose subject is a picture, a pattern, an heraldic device, or an intermixture of these three; and some of the pictures, and of the pattern glass paintings appear to have been designed and executed in a particular style of their own. The various works thus present so many different points for consideration as to render it impossible to lay down any one general rule for deciding on their pretensions; but by stating, as concisely as we can, the principles by which we have been guided in making the following observations, an opportunity is afforded of ascertaining their correctness or incorrectness; and the exhibitors may be enabled to draw their own conclusions as to the opinion which we entertain of the merits of their works.

It is hardly necessary to observe that glass painting must be judged by a different standard from that which is applied to other kinds of painting. The material employed imposes upon the artist an obedience to certain conditions in the design and execution of the work. His object should be, not to produce the best possible picture, but the best brilliant and transparent picture. Among the excellencies which are equally essential to a good glass painting, and to an oil or fresco painting, may be mentioned, a design which is pleasing in itself, and

which is composed with reference to the effect sought to be produced at the distance from which it is intended to be viewed, correct drawing (which includes the course of the shadows as well as mere outlines), and harmony of colour. But such a composition must be chosen, and such a mode of colouring must be adopted, as are calculated, among other things, to display to the best advantage the brilliancy and transparency of the material, and to accord best with the mechanical construction of glass painting, which, unless it is of very moderate dimensions, must necessarily consist of several pieces of glass, connected together with lead or other metal, and supported with iron bars.

As a general rule, the best, because the most effective, composition for a glass painting (not being a mere pattern), is a single figure, or a group consisting of foreground figures, with either a landscape, an architectural, or a plain coloured back-ground; the landscape, if any, being treated as a mere accessory to the group. And the mode of execution which appears to display to the best advantage the brilliancy and transparency of the material is, where the colouring is chiefly produced by means of glass coloured in the manufacture;* where the shadows are transparent, but have hard and sharp edges; and, above all, where a large proportion of the lights are left clear and unencumbered with enamel paint.

Of the correctness of the view, so far as it relates to the sort of composition, and to the mode of colouring best suited for a glass window, we have the less doubt, since nearly all the exhibitors have acted consistently with it; but we also find that our opinion of hard-edged shadows and clear lights is opposed to the practice of nearly all the exhibitors, including those most distinguished, by their works.

To their authority we can only oppose that of the glass painters of the first half of the sixteenth century, when, owing to the similarity of the material, the conditions of glass painting very closely resembled the conditions of modern glass painting; and we would invite a comparison of such works as, for instance, the windows of the chapel of the Miraculous Sacrament, on the north side of the choir of St. Gudule's Cathedral, Brussels, and the two transept windows of that cathedral, with the windows of Gouda Church, Holland, and of Amsterdam Cathedral, both which are of the last half of the sixteenth century, with any of the works now exhibited; and if it appears that the Brussels and Lichfield windows are more brilliant, more glass-like, and (allowance being made for modern improvements in drawing) as pictorially effective as any of the other works to which we have referred, then we are justified in considering that the limit to which the obscuration of the glass may be carried was reached at the end of the first half of the sixteenth century, and, consequently, in regarding the works of that period as standards of true glass painting by which other glass paintings of similar nature may be judged.

The question, however, must ever be matter of opinion, and must ultimately

* We are speaking of the art in its present state; if enamel painting were to be so far improved as to admit of glass being, by this means, as strongly and vividly coloured as it can be coloured in its manufacture, the objection to colouring glass with enamel colours would fail. But to such an improvement certain physical obstacles appear to be opposed.

resolve itself into a question of taste, which can only be determined by actually making the comparison suggested, and inspecting the windows themselves.

In estimating, then, the merits of a glass painting, we have to consider, first, to what extent the conditions of the art have been observed; secondly, its artistic merit as a picture or painting.

According to these principles, a work in which the composition and drawing are indifferent, but which displays vivid and powerful colouring, or is brilliant in effect, is preferable, as a glass painting, to one which is dark and dull, but in which the drawing and composition are good. Of this, we have a striking example in the ante-chapel of New College, Oxford. Sir Joshua Reynolds' window, with all its excellencies of drawing and composition, is not to be compared in effect with the rude windows of Wykeham's time that surround it. Still, though a due regard to the conditions of the art is of such preponderating weight in the merits of a glass painting, other artistic qualities, as has been said before, are not to be overlooked; consequently, of two glass paintings in which the conditions of the art have been equally observed or equally violated, that is to be preferred which displays the highest merits in composition, drawing, and other qualities of a good picture.

But besides the two points of view just mentioned, in which a glass painting is to be considered, it is necessary, in order to estimate the quality of a work professing to be executed in imitation of any ancient style, to judge of it with reference to the standard which its author has himself chosen. To condemn it, on the one hand, if it falls short of the model which it professes to follow, and fails in the effect which it professes to produce; and, on the other hand, perhaps to make some allowance for peculiarities which would be objected to as faults, if they were not excused by the necessity of adhering to some characteristic features of the adopted style.

On examining an original specimen of any ancient style of glass painting, we cannot fail to be struck with the general harmony of its features. Not only does a strict consistency exist between the character of the figures and of the ornamental details, but these agree with the nature of the design and mode of execution, which again seem to be adopted and formed with reference to the nature and quality of the material used. The changes effected in process of time in the composition and texture of the glass appear to have involved, in the opinion of the ancient artists, corresponding changes in the very conditions of glass painting.

In all the glass paintings of earlier date than the last quarter of the fourteenth century—until which period the material commonly in use was not over clear, substantial in appearance, and intense in colour—the artists seem to have relied for effect principally on the richness and depth of the colouring. In these works the means of representation may be said to have been reduced almost to the lowest degree. Even the picture glass paintings are little else than exceedingly powerful and brilliant mosaics. The figures are hardly distinguishable from each other, nor from the back-ground of the composition, otherwise than by their outlines and local colouring. The style of the painting is simple, bold, and forcible, as if the artists apprehended that softness of finish and nice gradations of light and shade would be useless and ineffective, and deemed those qualities to be alike incompatible with the simplicity of the composition, the positive character of the

colouring, and the general brilliancy of the work. The drawing is effected by thick black outlines, which always strengthen, and sometimes even supply the place of broader shadows, and these shadows, when compared with those of later times, are weak, and are in great measure lost in the depth of the local colouring; which circumstance, however, renders their hardness the less perceptible.

The same style of execution is extended to patterns as well as to pictures. The design is traced on the glass with firm and strong outlines; and it is hardly necessary to remark—for this is observable in every original work,—that the harmony in form and character between the figures and the ornamental details, proclaims them to be the production of the same hand, and the conception of the same mind.

In all subsequent glass paintings, until the revival of the more ancient styles, which took place about twenty-five years ago, we may observe that in proportion as the glass became more pellucid, more flimsy in substance and appearance, and less powerful and intense in colour, a less mosaic and an increased pictorial effect was aimed at. The weakness of individual colours was in a great measure compensated by their employment in larger masses, by judicious contrasts, and by harmonious arrangement. Their depth was increased by means of broader and more powerful shadowing, and a certain degree of richness was imparted by the more liberal use of diaper patterns and other minute embellishments. The drawing became more delicate, nicely-graduated and highly-wrought shadows were to a great extent substituted for stiff black outlines, and in many instances considerable attention was paid to perspective, and to atmospheric effects. In short, it would seem that the artists considered that the more refined nature of the material demanded as well as favoured a more refined pictorial treatment, and sought to compensate for its comparative thinness and weakness by the introduction of beauties of another description. The new system, it is true, was not fully developed until the middle of the sixteenth century; but its commencement may be easily traced as far back as the end of the fourteenth, by which time the principal change in the nature of the material had taken place.

Many persons, and among them some whose opinions are entitled to consideration, differ from the opinion that the material used previous to 1380 has not hitherto been successfully imitated; but on a point of so much importance we are bound to retain our opinion until convinced of its fallacy. That there is a visible difference in the appearance of modern glass and of that belonging to these early periods is admitted; but it is attempted to be accounted for by the supposition that it is solely due to the effect of age and exposure to the weather, and that the ancient glass when first put up, must have appeared as weak and flimsy as our own. But as it is evident on breaking a piece of ancient glass, that the effect of antiquity is confined to its surface, the above supposition is destroyed by the observation that modern glass whose surfaces have, by artificial means, been reduced as nearly as possible to the same condition as that of the old glass, fails, nevertheless, in its resemblance to the old.

One of the most favourable examples of the closeness to which imitation of the thirteenth century glass can be carried by splashing the glass with enamel brown and other expedients, is afforded by a window recently put up in Mans Cathedral (the third clerestory window from the west on the south side of the choir). We

are unable to say by whom it was painted. But although the design, owing to the breadth of its colouring, is favourable to modern glass, the deception is decidedly incomplete. Equally unsuccessful are the admirable restorations of the earlier thirteenth century windows in some of the apsidal chapels of Bourges Cathedral, executed, we believe, by M. Lusson. The modern glass may here be easily distinguished from the old by its want of crispness and its thinness, although it has been obscured in imitation of the effect produced by age and long exposure to the atmosphere.

We are strongly impressed with the opinion that the difference in effect between such ancient and modern glass does not depend on the state of the surface, but on the composition of the material, and this opinion has been much strengthened by the result of some chemical experiments recently made, by which the very great difference in the composition of modern glass and that of glass of the thirteenth century is clearly demonstrated.

Assuming the truth of the foregoing observations, it is obvious how important a bearing they have on modern imitations of the ancient style of glass painting. Those of the periods earlier than the last quarter of the fourth century having to be worked out in a mode of execution adapted to, and formed with reference to, a material very different from that of the present day, and therefore labouring under a disadvantage which hardly any skill or ingenuity can overcome; whilst, on the other hand, the glass of the present day resembling that of the fourteenth, or still more closely that of the sixteenth century, there is proportionably less difficulty, as far as material is concerned, in the way of the successful execution of works in the style of these periods.

The defects which appear to us to prevail the most generally are, first, the misapplication of the materials, so that works which would have possessed merits as enamel paintings on china or any other opaque body, are, as glass paintings, weak in colour and deficient in transparency. The ill effect of thus confounding the principles of painting on an opaque surface with principles of painting upon a transparent body, like glass, are strikingly exemplified by observing, in the works of this description in the Exhibition, the difficulties the artist has had to contend with in the management of his material, notwithstanding the dexterity of his handling. The vividness of effect produced is barely superior to that of an oil painting, and in tone, transparency of shadow, and general harmony, the glass is very inferior to a painting in oil. The metallic framework which, in every well-contrived glass painting, is conducive to the good effect of the work, is here an eye-sore, imparting to those outlines which it follows a harshness which does not accord with the elaborate softness which many of our modern artists have adopted in lieu of the severer style of their predecessors.

Secondly. Non-adherence to the style, which has been selected by an artist for imitation in any particular work. For instance, we have sometimes found associated together in the same glass-painting, borders in the style of the fourteenth century, canopies of the fifteenth, and figures of the sixteenth. In others, though the ornamentation is drawn and executed in the style of an early period, the figures are either wholly in the style of a later one, or else accord with the ornamentation only in the drawing or composition; the elaborate softness of their execution having been borrowed from a considerably later period. Others, in

which the drawing, mode of execution, and composition of an early period are scrupulously observed, both in the figures and ornamental details, are executed in a material, which, owing to its greater pellucidness, is essentially different from that in use at the period chosen for imitation; so that sometimes the different portions of the design itself are incongruous; sometimes the design is of such a character as to be unsuitable to the nature of the material in which it is worked; and we may add that the various attempts which have been made to imitate the richness and depth of the ancient material, by coating the glass with enamel paint, have produced no other effect than that of depriving it of its brilliancy, and consequently the glass paintings, in which this expedient has been resorted to, of one of their chief and distinguishing merits.

These observations apply, in our opinion, very generally to the modern style of imitating ancient glass paintings. Improvement in the style of drawing, and many other beauties, are to be met with in the objects exhibited in Hyde Park, but these beauties are too often neutralized by the defects to which we have ventured to allude. The works are not original compositions, nor are they correct copies of the various styles which they profess to imitate.

BERTINI, of Milan. "Dante and his Thoughts."—In point of size, harmony of design, and beauty of drawing, this window is certainly entitled to claim a first-rate place; nor is there any work in the Exhibition, which, taken as a whole, is so superior to it as a glass painting as to prevent its merit as a work of art preponderating. Its defect is certainly the want of general brilliancy. Except in the Queen's glory, in the letters of the inscription over Dante's head, in the shields below, and the wreath surrounding his name (all which are true specimens of glass painting), and in the border of the windows, there are no sharp clear lights; and although pot-metal or flashed glass is used in places, as in Dante's robe, in the steps of the seat, in the sky to Domenico and Francisco, and in the robe of the figure in No. 4, it has been reduced to the same opacity as that of the enamel colouring employed in other parts of the window. The subjects taken from the infernal regions, Nos. 1, 2, 3, 4, are scarcely fitted for a glass painting, which is not suited for dark effects. The whole work is executed with so much softness, and is so highly finished, that the metallic fastenings have a harsh effect and form black lines, which do not harmonize with the delicacy of the painting; and though in general they are concealed with wonderful skill, yet they do appear in places, and rivet the attention the more the window is looked at. It may seem presumptuous thus to criticize one of the best works of the day; but the admiration which we feel for it has led us to compare it more rigidly with the windows at Brussels, and to arrive at the conclusion that it would suffer by comparison in point of general effect, though it would doubtless be superior to them in artistic refinement and drawing. Compared, however, with the more modern works it appears to advantage; for the quantity of white light introduced in the upper part of the design, in the Madonna, and in the tracery above, the angels, the crockets, and above all, in the ornamental bands or fillets which serve at once to connect together and to frame the different subjects, imparts to the window a silvery or glass-like effect, which none of the others possess, and which completely rescues the work from the imputation of being like a fresco painting. The execution of the crockets and of the foliated ornaments round the shield is quite perfect; but perhaps the greatest

display of skill is the manner in which Dante's head is made to stand free from the chair's back. The representation of one of the ladies' silk dresses and of the lining of Dante's cloak is a wonderful achievement in painted glass, and perhaps could not be accomplished in a work in which clear lights were considered indispensable.

In conclusion, we have only further to observe, that the defects which we have ventured to notice are those which prevail very generally in the works of the present day; but the beauties exhibited by M. Bertini in this production greatly preponderate, and are his own.

CAPRONNIER, J. B., Brussels.—The conditions of the art of glass painting appear to have been complied with, on the whole, in this work more fully than in any other of equal or superior size in the Exhibition; for not only is the drawing good, the composition simple and calculated for distinctness of effect at a distance, but the angular character of the draperies, and the fineness and decision of the entire execution are admirably suited to the nature of painted glass. The style principally followed is that of the first half of the sixteenth century. The absence of clear light, and over-painting of the head of the principal figure are to be regretted as deviations from what we consider to be a correct observance of the style adopted. Still it is impossible to refuse to this composition a first-rate place.

The above is an extract from a very able Report upon the art of glass painting, and the objects exhibited, which Mr. Charles Winston, of the Temple, has had the kindness to supply.

JURY AWARDS, CLASS XXIV.

COUNCIL MEDAL.

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
France - - -	656	Maës, M. - - - -	Novelty of chemical application in the manufacture of optical and other descriptions of glass.

PRIZE MEDAL.

France - - -	1540	Andelle, G. and Co. - -	French bottles.
United Kingdom - -	19	Bacchus and Sons - -	Cut glass, imitation of Venetian glass.
Belgium - - -	390	Bennert and Bivort - -	Window glass.
France - - -	53	Berlioz and Co. - -	Plate glass for mirrors.
Austria - - -	600	Bigaglia, P. - -	Venetian glass.
United Kingdom - -	408	British Plate Glass Company (Cl. xxvi.)	Plate glass for mirrors.
United States - -	113	Brooklyn Flint Glass Company.	Flint glass.
France - - -	39	Burgun, Waller, Berger, and Co.	Watch glasses.
United Kingdom - -	47	Coathupes and Co. - -	Glass pipes; curtain poles.
United Kingdom - -	15	Davis, Greathhead, and Green.	Cut and coloured glass, Greek and Etruscan vases.

PRIZE MEDAL—continued.

Nation.	No in Catalogue.	Name of Exhibitor.	Objects Rewarded.
France - - -	1187	Devilane Brothers - -	French bottle glass.
France - - -	1396	De Poilly and Co. - -	French bottle glass.
United Kingdom - -	32	Green, J. G. - - -	Design—form—engraving on glass.
Austria - - -	587	Harrach, F. E., Count Von	Bohemian glass.
United Kingdom - -	21	Harris, R. and Son - -	Cut glass, pressed, moulded, and coloured.
United Kingdom - -	100	Hartley, J. and Co. - -	Rolled plate glass for roofs, rough plate.
United Kingdom - -	18	Lloyd and Summerfield -	Cut glass medallions.
Austria - - -	595	Meyr's Nephews - - -	Bohemian glass.
United Kingdom - -	13	Molineaux, Webb, and Co.	Cut glass, coloured or pressed.
United Kingdom - -	20	Oser, F. and Co. - - -	Cut-glass, various—novelty of design in fountain, candelabra, &c.
France - - -	674	Patonx, Drion, and Co. -	Glass.
United Kingdom - -	33	Pellatt, Apsley, and Co. -	Cut-glass crystal—imitation of Venetian glass, gems, &c.
United Kingdom - -	31	Powell and Sons - - -	Fine crystal (purity of colour, pipes and joints.)
Netherlands - - -	99	Regout, P. - - - - -	Tubing and table glass.
United Kingdom - -	14	Richardson, W. H. B. and J.	Cut crystal—coloured pipes, coloured glass.
France - - -	1445	Robichon Brothers and Co.	Crown glass.
Prussia - - -	208	Schaffgotsch, Count - -	Bohemian glass.
United Kingdom - -	4	Swinburne, R. W. and Co.	Glass dome, plate glass.
United Kingdom - -	399	Thames Plate Glass Company (Cl. xxvi.—Main Avenue West.)	Plate glass.
France - - -	714	Van Leemput de Colnet, and Co.	Bottle glass.
United Kingdom - -	27	Varnish, E. - - - - -	Silvered glass.
United Kingdom - -	17	Webb, T. - - - - -	Cut glass.

HONOURABLE MENTION.

Austria - - -	582	Abdele, F. - - - - -	Looking glass.
Portugal - - -	1023	Afonso, M. J. - - - -	Cut glass.
United Kingdom - -	6	Aire and Calder Bottle Company.	Bottle glass.
Portugal - - -	1044 to 1046	Basto, Pinto, and Co. -	Sketched window glass.
Belgium - - -	387	Capellemans, J. B. - -	Bottles.
United Kingdom - -	25	Claudet and Houghton -	Glass shades (from Messrs. Chance).
United Kingdom - -	2	Copeland, W. T., Alderman, M. P. (Cl. xxv.) -	Table glass.
France - - -	1157	Corderant, A. - - - -	Door handles, &c.
United Kingdom - -	37	Davies, G. - - - - -	Imitation of marble.
Egypt - - -	386	Egypt, H. H. The Vice-roy of.	Rose-water bottle.
United Kingdom - -	40	Ford, D. - - - - -	Vitrum marmoratum.
United Kingdom - -	12	Gatchell, G. - - - - -	Glass centre dish.
United Kingdom - -	41	Hall, J. W. - - - - -	Ornamental cut-glass window.
United Kingdom - -	46A	Hancock, Rixon, and Dunt	Cut glass chandelier.
Bavaria - - -	60	Hechinger, H. - - - -	Mirrors, &c.
Bavaria - - -	61	Heilbroun, L. - - - -	Mirrors, &c.
Austria - - -	588	Hegenbarth, A. - - - -	Bohemian glass.
Austria - - -	589	Hellmich, F. A. - - - -	Bohemian glass.
Austria - - -	590	Hofmann, W. - - - - -	Bohemian glass.

HONOURABLE MENTION—*continued*.

Nation.	No. in Catalogue.	Name of Exhibitor.	Objects Rewarded.
Turkey - - -	-	Indgir-keny, Imperial Glasshouse of.	Venetian glass.
United Kingdom -	11	Jones and Sons - - -	Coloured glass.
United Kingdom -	3	Kidd, W. - - -	Engraving and silvering on glass.
Austria - - -	596	König, F. P. - - -	Centre-pieces, fruit-dishes, &c.
United Kingdom -	23	Lockhead, J. - - -	Glass ventilators, &c.
United Kingdom -	30	Naylor, W. - - -	Engraved glass, &c.—various forms and patterns.
Bavaria - - -	62	Neft, M. C. - - -	Specimens of white crown glass.
Austria - - -	597	Pelikan, J. - - -	Glass goblets.
United Kingdom -	36	Perry and Co. - - -	Cut-glass chandelier.
France - - -	981	Renard and Son - - -	Plate glass.
Prussia - - -	768	Röhrig, C. - - -	Glass shades, &c.
United Kingdom -	1	Ross, O'Connor, and Carson.	Watch glasses.
Russia - - -	203	Salivsky, Madam - - -	Table glass, &c.
Russia - - -	8	Shephard, J. - - -	Glass tubing.
Frankfort-on-Maine	22	Vogelsang, J. Sons. - - -	Bohemian glass.

SWITZERLAND, 75, DAGUET,* F., Optical Glass.

* This Exhibitor was awarded a Council Medal by the Jury of Class X., and his name appears in their list of awards.

DE MAULEY, *Reporter*.

London, September 1851.

CLASS XXV.

REPORT ON CERAMIC MANUFACTURES.

Jury.

DUKE OF ARBUTHNOT, *Chairman and Reporter*, Stafford House, St. James's, and Roseneath.
CHARLES BARING WALL, M.P., F.R.S., *Deputy Chairman*, 44 Berkeley Square.

E. EBELMEN, France; *Director of the National Manufactures, Sèvres*; Member of
Central Jury, &c.

GABRIEL KAMENSKY, Russia; *Councillor of the Administration of Finances, and*
Commissioner in London.

W. MORTLOCK, 18 Regent Street, Waterloo Place; *China Manufacturer.*

F. ODERNHIMER, Zollverein; *Director of the Board of Trade and Commerce,*
Wiesbaden.

AUGUSTUS PINTO BASTO, Portugal.

JOHN A. WISE, Clayton Hall, Newcastle-under-Lyne, Staffordshire.

Associates.

E. H. BALDOCK, M.P., 5 Hyde Park Place. (*Juror in Class XXIV.*)

THOMAS HETHINGTON HENRY, F.R.S., 18 Lincoln's Inn Fields; *Analytical Chemist.*

IN framing our Report on Class XXV. we are desirous of explaining, in the first place, the view we take of the duty assigned to us, as determined by the rules of the Royal Commissioners, and by the nature of the Class itself.

In the first place, the appointment of Juries implies, of course, that they are to judge of the comparative merits of the articles submitted to their inspection. In the second place, the fact of Medals being intrusted to their award implies, farther, that it is their duty to specify those articles which, in respect of high degrees of merit, they deem most remarkable. And lastly, the injunction to accompany their judgment with a Report, implies an expectation that the Juries, besides explaining to a certain extent the grounds on which that judgment has been come to in respect of Medals, should also indicate their opinion, generally, on different kinds or minor degrees of merit.

These duties, however, become somewhat complicated by a special instruction from the Royal Commissioners that the Juries are to avoid giving encouragement to the distinctions of a merely individual character, and by an explanation that the awards of Medals of different orders should not imply corresponding differences of degree in merit in the "same class of subjects." We have been much impressed both with the importance of complying with this instruction of the Commissioners, and with the difficulty of reconciling it completely with the necessary exercise of our functions. We have felt that in case of the Council Medal being awarded to one or more exhibitors of ceramic manufacture, "individual distinctions" would be necessarily involved between those exhibitors, and others to whom only the Prize Medal may be given; and again, whether the Council Medal is given or

not to any, the same distinctions may be felt between those exhibitors who do get the Prize Medal and those who receive none.

The withdrawal of the Council Medal from the direct award of the Juries, and the limitation of their duty to recommendations merely for that award, has divided the responsibility, but has not removed the difficulty arising out of these considerations; inasmuch as recommendations, whether acceded to or not, involve the same distinctions as an actual award.

It has therefore been a matter of anxious consideration among the Juries to come to something like a common understanding as to the grounds on which such recommendations should be made; and the group to which we belong, accordingly laid down the following general definition of the kinds of merit which ought alone to be so distinguished;—"Important inventions and discoveries, or originality combined with excellence of design; novel application of known discoveries; great utility combined with economy and beauty; excellence of workmanship and quality."

Some of these definitions are obviously not easily applied to the kind of merit usually claimed for articles of ceramic manufacture; whilst others would require to be taken in an adapted sense. "Novelty of invention," unless displayed in entirely new compositions of the elementary earths, or in entirely new modes of dealing with them, will in such manufacture be generally reducible to improved methods of execution. Or if a higher sense be attached to "invention," as applied to form and high artistic merit, it will then fall under the other definition laid down, viz., "beauty and originality of design."

Understanding "invention" in the former and stricter sense, there is only one article in our Class in respect to which any important claim could be well advanced: we refer to that particular paste or body which has been variously called Parian, Carrara, or Statuary Porcelain, and which must undoubtedly be viewed as marking an important advance in the ceramic manufacture of this country. The facility and comparative cheapness with which the highest works of sculpture can be reproduced in this material—its durability and its beauty, have combined to give an important stimulus to the trade, and if well employed may much contribute to improve the public taste. It has already led to the great multiplication of copies of both antique and modern groups and statutes, as well as to new designs of a similar kind.

But whilst fully acknowledging the importance to the ceramic art of this material, we do not feel called upon to found upon it any recommendation for a Council Medal. In the first place, the amount of novelty in the material is not easily defined, it being a modification of that which has long been known, and applied to the same department of art, under the name of Biscuit. However important this modification may be, it is hardly entitled to rank as an entirely new invention, especially as the improved result is attainable by several varieties of composition. This seems sufficiently established, not only by the fact that different manufacturers produce substantially the same material without identity of process, but by the further fact, that one of those who prefer a claim to the origination of parian expressly states that in his hands it has already undergone one important change.

In addition to this consideration, the Jury find that they could not recommend

an award of the Council Medal for the invention of parian without deciding on the disputed claim of priority between very eminent firms, who severally advance that claim with equal confidence. We have not felt it to be our duty to come to any such decision; especially as it would appear from the statement of each party that, whichever may have actually been first in publicly producing articles in this material, both were contemporaneously working with success towards the same result. We may add that the introduction of parian took place several years ago.

There is one other claim to novelty of invention in our Class which, perhaps, goes nearer to fulfil the necessary conditions: we allude to the process of M. BAPTEROSSES for the manufacture of huttons by pressure applied to a dry body in the state of powder; but here also we consider the merit to be to a great extent divided. The original idea of this process is due to Mr. R. Prosser; and, under a patent obtained by him, it was carried on for some time by Messrs. Minton. The improvements, however, effected upon the process by J. F. Bapterosses, have been so great and so important, that the invention has, in a great measure, become his own, and has enabled him to beat the English manufacturers entirely out of the market. The principle, however, is identical. Under these circumstances, we have been unable to recommend M. Bapterosses to an award of the Council Medal on the ground of novelty of invention; although his merit is undoubtedly so high that we deem him well entitled, not merely to the award of the Prize Medal, but to very Special and Honourable Mention, on account of the inventive talent displayed in his process.

As the Jury do not, therefore, think that any sufficient ground for the award of the Council Medal has been presented, as regards priority of invention, it has only remained to consider whether they could recommend that award on the ground of "beauty and originality of design."

Although we do not hold ourselves bound to any very close or literal interpretation of this definition, we should still be departing from the whole intention with which the Council Medal was withdrawn from the direct award of the Juries, if we were to recommend it for any article or set of articles on account simply of superior execution in the same class of subject; and that, in as far as possible, we ought to limit ourselves in such recommendations to merit capable of being clearly separated from others *in kind*, and not merely *in degree*. It is only by adhering to this distinction that we can comply with the important instruction to avoid giving encouragement to "individual competition;" and although it is a line which cannot always be laid down with perfect precision, it is still capable of being followed with substantial fairness. For example, if two manufacturers exhibit each vases, plates, &c., with flower or landscape painting, and if the articles of the one were of great superiority *in execution* to the other, this superiority, however great, ought not to be expressed by a recommendation to the Council Medal, because these two exhibitors are evidently competitors in the same kind of merit; whereas, if one manufacturer shows articles of the above description, whilst another shows articles of new and beautiful form, and of high artistic merit in the grouping and design of figures, such two exhibitors are evidently not competitors in the same kind of merit, and the latter might be recommended for the award of the Council Medal without any "individual distinctions in the same class of subject" being drawn between

them. The same distinction may be traced even in kinds of merit, which are both in a certain sense imitative. The successful introducer, into this country, of important processes of manufacture formerly confined to other lands, possesses a merit very different in kind from imitations more or less successful of the paintings and ornaments of old Sèvres or old Dresden.

Having thus explained the principles on which we have thought it our duty to consider recommendations for the Council Medal, we have only shortly to point out the consequences which result on the value to be assigned to the Prize Medal. Being the only one which we have to award for the whole articles of our Class,—except the few which answer the conditions demanded for the Council Medal,—it follows that very wide differences in degrees of merit must indiscriminately receive the same acknowledgment—so far as the Medal merely is concerned. This circumstance will be strongly felt by many of the exhibitors who receive the Medal, and will diminish the value set on our awards. We have only to explain that it has tended equally to diminish the satisfaction with which we have made them; but that no evil or injury can arise from the result, provided the cause of it is publicly known and understood. The task of marking distinctions of merit between individual competitors in the same class of article was not only not given to us, but was advisedly withheld; and we have, therefore, only to explain emphatically that we by no means regarded as on the same level, or even near the same level, all those exhibitors to whom, nevertheless, we have been obliged to give the same award. In our Report we have held ourselves at liberty to depart, to a certain extent, from the rule which applies to Medals, and to point out the broader individual distinctions observable in our Class.

One other circumstance has presented itself respecting our awards, which we feel it necessary to mention. Our Class contains the produce of royal, national, or imperial manufactories; and it has been argued that these ought not to be brought into competition with the produce of private enterprise. In a certain sense we admit this argument to be just. The Sèvres manufactory, for example, being supported by national funds, and carried on as a school of national design, without reference to profit or loss,—the latter, indeed, being the admitted result,—we certainly feel that its productions cannot be fairly considered as standing on the same footing with those of private manufacturers. The latter have a greater number of conditions to fulfil, and of difficulties to overcome. The element of price, being an element of the most important character, does not enter into the view of the one, whilst, for the most part, it strictly limits the efforts of the other. The *merit*, therefore, as regards commercial value of their respective works, cannot be easily compared, and is certainly not measured by a comparison simply of their beauty. We are relieved, however, from the difficulty which might arise out of these considerations by understanding that we are to judge of the articles in our Class as they appear before us, without reference to extraneous considerations respecting origin. We think it our duty, however, in the Report to point out the important distinction above referred to, and to explain distinctly that, in admitting, as we unanimously do, the very high character of the Sèvres Exhibition, and in recommending it to an award of the Council Medal, we do not hold that in point of merit it can be justly compared with any other series of articles in our Class, except those which are similarly circumstanced.

Before proceeding to notice particulars, we may observe that the ceramic art of the world is represented by a series of articles, which, though not calculated to illustrate its past history and progress, is at least sufficient to give a very adequate idea of its present condition. The imperial, royal, or national manufactories of Russia, Austria, Prussia, Saxony, Bavaria, Denmark, and France, have all sent specimens of their production. Private enterprise in the same art is honourably represented from France, from many of the States of the Zollverein, and from Austria. A few exhibitors appear from Portugal. One article is shown from America. The manufacture of Turkey is also exhibited in a limited number of articles. The East India Company show specimens of the graceful forms of Indian pottery; whilst the well-known productions of China are among the articles collected from that country. But, undoubtedly, the collection which most largely represents the commercial importance of the ceramic art as a branch of manufacture, and the advances it is capable of making under no other influence than that of private enterprise and public taste, is that which is exhibited on the British side, and mainly contributed by the Staffordshire potteries.

MINTON, H., and Co., Stoke-on-Trent, Staffordshire (1), stand foremost among the British exhibitors for the number, variety, and beauty of their articles.

We have found it necessary to view this collection in two divisions: first, in respect of a group of articles which we have considered distinguishable in kind, and not merely in degree of merit from all others in the Class; and, secondly, another group which, though of high excellence and beauty, must be looked upon as claiming merit of the same kind with articles exhibited by several other manufacturers. The first of these is the great dessert service, which has attracted universal notice.

Some objection has been felt, and has been stated in our Jury, to the principle of mixing together the two different bodies of porcelain and parian, as detracting from unity of effect, and, to a certain extent, from merit of manufacture; but it may be questioned how far this objection could be sustained, except on a general rule which would be far from receiving universal assent. Another objection has been started to this service,—with reference to the position of the figures, as being too purely and evidently for ornament alone, and having too little connection with the structure and support of the vessels to which they are applied. To this it may be replied, that such use of figures, for ornament simply, is familiar in the best examples of ceramic art; although it is clearly one which requires to be very strictly governed by good taste, lest it should become redundant, and cease to be subordinate to the general design. It has been further remarked that the figures in some pieces of the service present too many salient points, which render the whole peculiarly liable to injury. In articles not purely decorative, but intended for use, this objection refers to a point well deserving the attention of designers and manufacturers.

The Jury were, however, unanimously of opinion that the dessert service of Messrs. MINTON, being one of original design, presents a very high degree of beauty and harmony of effect; and that the design and modelling of the figures, in many of the pieces, are full of grace and spirit, evincing a remarkable degree of artistic merit.

The Jury must specially mention, as belonging to the first group of articles,

the garden-pots and vases exhibited by Messrs. Minton, modelled in imitation of the old Majolica ware, and not only remarkable for the success with which the effect of that ware is attained, but for novelty and beauty of design. A large vase, intended for similar purposes, designed by Baron MAROCHETTI, and executed by Messrs. Minton, is worthy of notice, both for beauty of style and great size.

Thirdly, the attention of the Jury was directed to the manufacture of hard porcelain for chemical purposes, lately established by Messrs. MINTON. It is well known that for such articles the laboratory has hitherto been dependent on the Dresden, Berlin, and other foreign manufactories: these crucibles and capsules have been subjected by Mr. Henry, at the instance of the Jury, to the severest chemical tests, along with specimens from Dresden, and have been found to stand these tests with perfect success; and besides being fully equal to the German ware in quality, they have the additional merit of being considerably cheaper. The Jury have considered the successful establishment of this manufacture in England as a matter of much importance and interest in a scientific point of view.

The second group of articles exhibited by Messrs. MINTON includes articles of very remarkable merit and beauty in almost every department of the ceramic art in which other English exhibitors compete, and would alone place Messrs. Minton among the very first of these. It is unnecessary in this Report to specify details minutely. It is sufficient to say that the articles exhibited by Messrs. Minton in imitation of old Sèvres, their flower-painting on a great variety of plates, on their small tea-services, on their earthenware basins, ewers, &c., and their smaller articles of a more purely decorative character, are all remarkable for great freshness of effect and excellent taste. Their parian figures are very good; and a chimney-piece of this material is a new and remarkable adaptation of it.

The Jury were unanimous in recommending Messrs. MINTON for a Council Medal, but founded it only on those articles first referred to, in respect of which originality and beauty of design, and not mere excellence of execution, were prominent merits.

COPELAND, W. T., Stoke-on-Trent, Staffordshire (2).—This exhibition is remarkable in several respects, especially for the great beauty of the parian groups and figures, several of which are eminently successful, and show complete mastery over this material in its best and most legitimate application. The Jury especially desire to mention the large porcelain slabs or panels decorated with flower-painting and other patterns, and now much used for fire-places, panels, tables, and a variety of other purposes connected with useful and ornamental furniture. The large flower-painting on some of these has a very handsome effect; and some Pompeian patterns are particularly pleasing.

Mr. COPELAND shows a large assortment of plates and other articles of ornamental porcelain. The flower-painting and gilding are, in many of them, very good; and especially in the centering of the plates, much taste is observable in the arrangement of the pattern. Some large vases of Etruscan shape and style of decoration are handsome. Mr. Copeland has also some articles, in which the effect of inlaid pearls and other jewels is rendered with considerable success. The value of this novel style may be a question of taste; but it undoubtedly exhibits much skill in the processes of manufacture. Other articles

are of a colour which is claimed as new, and has a certain richness of effect; but as no extensive series of articles with this colour are exhibited, the Jury are unable to state how far it can be reproduced with the certainty and uniformity of tint requisite to establish it as an improvement in ceramic decoration.

The earthenware of Mr. Copeland is of excellent quality; and on some plates the Jury observed prints worthy of special notice on account of simplicity and effect.

A Prize Medal is awarded him for the general high merit shown in his extensive collection.

WEDGWOOD, T., and SONS, Etruria, Staffordshire (6).—The articles exhibited by this firm are of great as well as of long-acknowledged merit—which consists chiefly in a faithful revival of the forms originated by the enterprise of the elder Wedgwood, some of the most remarkable of which were suggested by the genius of Flaxman. The classic beauty of some of these designs in terra cotta, jasper, and fine stoneware, has never since been surpassed or equalled; and no better desire could be entertained for the popular taste of this country in respect to this class of article than it should again be familiarized with these productions, which are of purely national origin, and are capable of being applied, and that cheaply, to almost every variety of domestic use. The white and printed earthenware of this firm, long celebrated, and particularly adapted for the export trade, maintains its old and well-merited reputation. The Jury have had great pleasure in giving a Prize Medal to this exhibitor.

ROSE, J., and Co., Coalbrook Dale, Shropshire (47), have exhibited porcelain services and other articles, which have attracted the special attention of the Jury. A dessert service of a rose ground is in particular remarkable, not only as being the nearest approach we have seen to the famous colour which it is designed to imitate, but for the excellence of the flower-painting, gilding, and other decorations, and the hardness and transparency of glaze. The same observation applies to other porcelain articles exhibited by this firm. The Jury have awarded to Messrs. ROSE and Co. a Prize Medal.

Before proceeding to mention the remaining English exhibitors to whom the Jury have awarded the Prize Medal, it may be well to state generally that this reward has respect chiefly, if not entirely, to that branch of the ceramic art which has been so extensively developed in England, and which has constituted it an important branch of our national industry, viz., the manufacture of stone and earthenware for domestic use. Articles of porcelain are also exhibited by some of the firms hereafter named; but the Jury have not been able to consider these as furnishing any ground for an award. In many cases, indeed, they are open to much criticism. Violent colours, and forms of loose indefinite shape, with much overloaded decoration, are frequent. The Jury has also noticed in some cases a fault to which they deem it well to direct attention, viz., the application of elaborate gilding and flower-painting, very suitable for porcelain, and sometimes of taste and execution which would have been well adapted to that material, to the inferior substances of stone and earthenware. Thus they consider a misapplication of skill and labour, expended with no adequate result, or with effects which, to a severe taste, are positively displeasing.

RIDGWAY, J., and Co., Caudon Place, Staffordshire (5), is one of the

most important manufacturers of earthenware in the Staffordshire Potteries, and exhibits articles in this department of first-rate quality. He has, with much spirit, ingenuity, and success, adapted this material to a variety of sanitary purposes; and in his stall the Jury observed the application, or the proposed application, of it to the banister and hand-rail of staircases. The specimen shown has at first sight a fresh and pleasing effect; but it may be questioned how far the mechanical difficulty of preserving accuracy of outlines in such large pieces as are requisite for this purpose can be successfully overcome. Lawn and conservatory fountains are also shown. The excellent quality of Messrs. Ridgway's ware, fully accounting for the commercial importance of their manufacture, has well entitled them, in the estimation of the Jury, to an award of the Prize Medal.

MAYER, T. J. and J., Burslem, Staffordshire (9), is another firm in this great branch of manufacture, and have exhibited a most interesting assortment of articles illustrative of the ordinary course of their trade, which is principally connected with the markets of the American Continent. Messrs. MAYER adapt their excellent material to every variety of useful purpose. One of these appears to be novel. They have made tea-urns of stoneware of a hard vitreous body, capable of withstanding the variations of temperature required in this application. They have also exhibited a variety of jugs in Parian, to which material they have applied colour with success, and in the composition of which they claim to have introduced some important modifications, with the view of rendering it proof against the effect of sudden changes of temperature, from boiling water, &c. The Jury have awarded to Messrs. MAYER a Prize Medal.

DIMMOCK, T., Shelton, Staffordshire (12).—This manufacturer has exhibited also earthenware of first-rate quality; and the Jury have much admired the neatness and good taste of his printed patterns, the agreeable effect of his "flowing blue," and in general the excellence of his ware. They have awarded a Prize Medal to this exhibitor.

ALCOCK, S. and Co., Burslem, Staffordshire (7).—This is another very important stall, as exhibiting the productions of a most extensive manufacturer, as well in porcelain as in the cheaper wares. Fancy articles in Parian or biscuit, of most delicate execution, are shown in this stall; and the Jury may mention as remarkable for fancy and freshness of effect a number of vases and jugs, of various forms and colours,—in particular some with white figures on a blue ground,—and some with green ornaments on the same ground. The Jury have awarded a Prize Medal.

MEIGH, C. and SONS, Hanley, Staffordshire (10), have exhibited excellent earthenware and some specimens of very remarkable size, especially two great vases, of one piece each. Their white enamel ware is of first-rate quality, and has an extensive hold on the market. The Jury have awarded a Prize Medal.

BOOTE, T. and R., Burslem, Staffordshire (11).—The articles exhibited in this stall are well worthy of special notice, on account both of some new processes in the manufacture of earthenware, and for the remarkable grace and beauty of some of the productions. The inlaying of one clay upon another,—as white upon blue,—is a process patented by Messrs. Boote, and has important results in rendering simple and easy certain effects and combinations of colour, which it was before impossible or difficult to produce. Some vases or jars exhibited by Messrs.

Boote, of a pale brown clay colour, with vine leaves and tendrils in high relief, are deserving of much praise as both extremely beautiful in design and in effect, and manifesting great skill in the management of material. The Jury have awarded a Prize Medal.

BOURNE, J., Derby Pottery, Derby (35).—This manufacturer has the merit of making stoneware bottles, which have the property of resisting the action of blacking in a manner which had been found extremely difficult of attainment. Their bottles are consequently employed to a large extent by Messrs. Day and Martin in the export trade to India and elsewhere. The Jury have awarded Mr. BOURNE a Prize Medal.

GREEN, S., and Co., Lambeth (Class XXVII., No. 125).—This firm exhibits some very remarkable specimens of stoneware, of great size, designed for the use of breweries, distilleries, &c., and which, on account of their hardness of glaze and other qualities, are of great value in many processes of chemical manufacture. The Jury have awarded a Prize Medal.

FINCH, J., London (38), exhibits articles of earthenware for wash and steam tubs, and other sanitary purposes, which have appeared to the Jury deserving the award of a Prize Medal.

The Jury, in addition to the Exhibitors before mentioned, to whom they have awarded Medals, desire to notice, as deserving very Honourable Mention, the following names:—

KENNEDY, W. S., Burslem, Staffordshire (4), who exhibits a large assortment of door-handles, "plaques," and other similar applications of china and earthenware, which has become in his hands a separate and important branch of ceramic manufacture. In the objects in this stall utility of application is combined with cheapness and agreeable appearance.

KEYS and MOUNTFORD, Newcastle-under-Lyne, Staffordshire (14), exhibit a series of statuettes in parian, well executed, and of a pretty effect.

PRATT, F. and R., and Co., Fenton, Staffordshire (22), exhibit some very remarkable specimens of a process which they seem to have greatly improved, viz., that of coloured printing under the glaze. The freshness and truth of the colouring, in some of these specimens, from pictures by Mulready, Wilkie, &c., are excellent. They also exhibit some earthenware of very good forms and style of ornament.

BELL, J., and Co., Glasgow (26), being the only Exhibitors in this class from Scotland, are deserving of notice, not only on this account, but on account also of the good quality and design of the ware they show.

CHAMBERLAIN and Co., of Worcester (44), exhibit some perforated china of agreeable effect.

EDWARDS, J., and Sons, Dale Hall, Staffordshire (37), exhibit a very large and fine model of the Warwick vase, in terracotta, and an earthenware tea-tray, &c.

GRAINGER, G., and Co., Worcester (46), exhibit articles of semi-porcelain, the good quality of some of which, for chemical purposes, is well attested.

SOUTHORN, W., and Co., Bromely, Shropshire (29), exhibit superior tobacco-pipes.

WOOD, G., Brentford (34), exhibits some ornamental orange-tree garden-pots of remarkable size.

SHARPE BROTHERS and Co., Swallincote, Burton-on-Trent (36), exhibit specimens of ironstone cane ware and printed earthenware, which are worthy of notice.

LEE, J., Rotherham, Yorkshire (48), exhibit the application of earthenware to letters for sign-boards, &c., which is a useful and pretty adaptation.

CHALLINOR, E.—Earthenware.

The attention of the Jury has been much attracted by two designs, one of a bust, the other of a vase, executed by JAMES MARSH, a young pupil of the School of Design, Hanley, Staffordshire, which possess remarkable merit, and deserve very Special and Honourable Mention.

In the French department of this Class the Jury need hardly state, that they have unanimously assigned the first place to the Sèvres manufactory, and have recommended the Council Medal to be awarded to its productions. They must, however, again explain, that the light in which these ought to be regarded is wholly different from that in which the productions of commercial industry and enterprise are viewed. Their position is analogous to that of articles produced in a school of design; and in the French expositions they have never been allowed to come into competition with the ordinary products of private enterprise. There is no reference to cheapness of production. The manufactory is maintained by a large annual grant from the public funds, and the sale of its products, though the prices are very high, is so far from being successful, in a commercial point of view, that the result is a large annual loss. The articles are, for the most part, purely decorative. But considered as a school of design, which is not to follow but to guide the public taste, the importance of the Sèvres manufactory can hardly be too highly estimated. Its influence has extended over the whole of Europe; and a large proportion of the most beautiful forms and styles of decoration, which are exhibited in the English and other departments of this Class, are derived, either by direct imitation, or by slight modification, from the old productions of the Sèvres school. The Jury are not prepared to say that the articles exhibited from Sèvres are equal, either as regards variety or excellence, to those which were sent forth from the same establishment at a former period, and on which its traditional fame is principally founded; but without any attempt at the mere imitation of its own old forms, it still produces wares of admirable texture and workmanship, and equally remarkable for great refinement and purity of taste, both as regards form and decoration. It is to be observed, however, that in respect to texture, extreme lightness and fineness are incompatible with the strength requisite for domestic use, however beautiful for merely ornamental china. The Jury may specify in the Sèvres department several large vases,—one or two of unusually large size,—which are all remarkable for beauty of form, and some of them for flower-painting, of admirable freshness and force. A large tazza, of fine blue, mounted in or-molu, is extremely handsome. As a work of pure ceramic art perhaps no single article is so remarkable as (No. 16) a Celadon green vase, with white figures in relief, manipulated in a novel and peculiar manner by the pencil. The handles are also of porcelain, the whole deriving no adventitious attraction from or-molu or gilding. The Jury also observed a beautiful adaptation of a cinque-cento form to a porcelain tazza, in white and gold; also a large plate or slab of porcelain for picture-painting, remarkable for great size, combined with truth of surface. Two perforated porcelain lanterns are worthy of Special Mention for very elaborate and

accurate execution. Some articles are exhibited with painting of figures (in Pompeian style), executed on an unglazed body, which produces a novel and agreeable effect. There are also two vases and covers, and a large tazza finely painted with figures in a subdued shade of blue, which are very beautiful.

M. M. JOUHANNEAUD and DUBOIS, Limoges (1630), are exhibitors to whom the Jury have had great pleasure in awarding a Prize Medal. Articles in porcelain, of great size, good design, accurate execution, are among their productions. In particular, the Jury would refer to a stork vase, in which the birds are modelled with great boldness and effect, as also the green foliage. The white ground is of excellent colour and glaze, and the whole result most agreeable. Some large white perforated bottles and a white and Celadon green vase, with leaves of *bleu de roi*, &c., are objects well deserving special notice. Altogether much taste and spirit distinguish these exhibitors.

LE BARON A. DU TREMBLAY, Rubelles, near Melun (395), exhibits a series of articles equally remarkable for cheapness, for novel and agreeable effect, and for the ingenuity of the process by which that effect is attained. It is called "émail ombrant," and consists in flooding coloured but transparent glazes over designs stamped in the body of the ware. A plane surface is thus produced, in which the cavities of the stamped design appear as shadows of various depths, the parts in highest relief coming nearest the surface of the glaze, and thus having the effect of the lights of the picture. Much taste is evinced in the selection of designs to which the process has been applied; and perhaps there is no other in the ceramic art by which, at so cheap a rate, designs of high artistic merit can be reproduced in the most harmonious tinting, for dessert or table services, and for other useful domestic purposes. The Jury have awarded to DU TREMBLAY a Prize Medal.

GILLE, J. M., porcelain manufacturer, Paris (848), exhibits a variety of articles of fancy porcelain, which show taste and skill in the management of the material. Some statuettes, birds, &c., are executed with great delicacy and sharpness. The Jury have awarded a Prize Medal to this exhibitor.

M. DE BETTIGNIES, St. Amand les Eaux, near Valenciennes (1086).—This manufactory is remarkable for keeping up the old "pâte tendre," which was so celebrated a product of Sèvres during a part of the eighteenth century, and this and the neighbouring manufactory of Tournay, in Belgium, are now the only two in Europe which maintain this particular kind of body. Much improvement has lately been effected by M. de Bettignies in the colouring and decoration of this ware; and specimens are exhibited, especially some vases of turquoise blue, which fully deserve, in the opinion of the Jury, the award of a Prize Medal.

M. MANSARD, Paris (1342), is an exhibitor whose *potterie grise* is excellent in its forms. There is an enamelled vase which is deserving of particular notice, and the Jury have awarded a Prize Medal.

BAPTEROSSES, J. F., Rue de la Muette, Paris (409), exhibits buttons made by a process equally effective and ingenious, described in the earlier part of this Report, by which an importance has been given to this branch of ceramic manufacture, which could not have otherwise attached to it. The Jury have had no hesitation in awarding a Prize Medal to M. Bapterosses, and Special Commendation.

The Jury have also awarded Prize Medals to the following Exhibitors:—

BASTO, PINTO, and Co. (Portugal, 1047 & 1108).

Copenhagen, THE ROYAL PORCELAIN MANUFACTORY at (33).

MADRAS POTTERY, The.

St. Petersburg, THE IMPERIAL CHINA MANUFACTORY at (318).

STRAHL, OTTO (Prussia, 206).

VILLEROY and BOCH (Prussia, 361).

ZIEGLER-PELLIS, Switzerland (260), terra-cotta, deserves Honourable Mention.

Besides these Exhibitors, the following names in the French department have been thought deserving of Special Mention:—H. I. NAST (659); ALLUAUD, sen. (1051); E. HONORÉ (877); C. AVISSEAU (1543); J. PETIT (1629); and GORSAS and PERIER (1253).

Austria.—The IMPERIAL PORCELAIN MANUFACTORY OF VIENNA (615) has exhibited a series of articles for table-services, of different kinds, flower-baskets, a table painted with shells, corals, &c., &c., which have certain merits, and the Jury have agreed to award a Prize Medal.

FISCHER, Moritz, Hungary (618), exhibits porcelain articles of table-ware, embossed with white and gold, and with other patterns. The texture and colour of the white are good, and the Jury have awarded a Prize Medal.

The Jury also considered, in the Austrian department, the Messrs. HAIDINGER BROTHERS, Ellbogen, Bohemia (620), as deserving Honourable Mention; as also C. FISCHER, Bohemia (617).

In the department of the Zollverein, the ROYAL PORCELAIN MANUFACTORY AT BERLIN (Prussia, 213) exhibits a variety of articles, of which the chief merit consists in the landscape-painting, which is extremely well executed, and is employed in the decoration of vases, plates, &c. The same good execution is carried out in picture-paintings, chiefly copies of pictures of the Flemish school, on similar articles of porcelain. Much of the Berlin china is so covered with gold and painting that the body of the ware is almost entirely concealed. There are also exhibited from Berlin some statuettes in porcelain, and candelabra of the same material, with leaves and figures on a pale greenish-grey ground, which are of good execution and design. The Jury have awarded a Prize Medal.

The ROYAL SAXON CHINA MANUFACTORY, Meissen (Saxony, 10), exhibits the hard porcelain for chemical purposes, for which it has been long celebrated; also a considerable variety of ornamental china, as well as of dinner and coffee services, &c., &c. Some of these with enamelled paintings are well executed. A camellia plant in full flower, entirely executed in porcelain, is a very remarkable example of a kind of work which has long maintained its ground in this manufactory, aided by the natural ductility of the clays which are employed. The flowers of this plant are executed in white of the greatest purity; and the leaves are all finely glazed. The Jury have awarded a Prize Medal.

The ROYAL BAVARIAN PORCELAIN MANUFACTORY (Bavaria, 64), Nymphenburg near Munich, exhibits articles in biscuit, and a variety in hard decorated porcelain, which manifest decided advance in taste both as to form and decoration. The picture-painting on some of these is extremely well executed. On the whole the Jury observe in this exhibition much spirit and originality, and have awarded it a Prize Medal.

Honourable Mention is accorded to the following:—

ARNOLDI, C. E. and F. (Prussia, 778).

Constantinople, PORCELAIN FACTORY at.

MATTSCHASS, J. G. IL (Widow), and Son (Prussia, 217).

TIELSCH, CARL, and Co. (Prussia, 219).

ARGYLL, *Reporter.*

October 1851.

CLASS XXVI.

REPORT ON DECORATIVE FURNITURE AND UPHOLSTERY, INCLUDING PAPER-HANGINGS, PAPIER-MACHE, AND JAPANNED GOODS.

Jury.

Professor ROESNER, *Chairman and Reporter*, Austria; President of the Imperial Academy of Fine Arts.

Lord ASHBURTON, *Deputy Chairman*, 82 Piccadilly.

JOHN LEWIS AUBERT, 20 Lower Road, Lalington; Paper-stainer.

CHARLES DE BEYNE, Russia; Architect.

FRANÇOIS COFFENS, Belgium; Architect.

J. G. CRACK, *Joint Reporter*, 14 Wigmore Street, Cavendish Square; House Decorator.

CHARLES CROCCO, Sardinia; Manufacturer.

JOHN JACKSON, 49 Rathbone Place; Manufacturer of Composition and Papier-maché Ornaments.

W. MEYER, North Germany.

N. RONDOT, France; late of Embassy to China, and Member of Central Jury.

EDWARD SWELL, 27 Albemarle Street; Upholsterer and Cabinet-maker.

JOHN WEBB, 8 Old Bond Street, Upholsterer and Cabinet-maker.

Associates.

Lieut.-Colonel DEMANET, 90 Warwick Street, Pimlico.

L. GRUNER, 12 Fiteroy Square; Architect. (Juror in Class XXIII.)

Chev. LENCIRA; Commissioner to the Exhibition for H. M. the King of Sardinia.

M. WOLOWSKI, France; Professor to Museum of Arts and Sciences, Member of the Central Jury, and of the Legislative Assembly of France. (Juror in Class XXIX.)

THE objects comprised in this class are of a kind intimately associated with the comfort and adornment of our dwellings; of great importance from the vast amount of skilled labour employed in their production; and of high interest as displaying the state of industrial art in various countries.

A popular taste must be greatly influenced by those things which are ever before the eye as household companions, and in the manufacture of these it is therefore most essential to attend to the principles of tasteful design, for by those principles an article obtains its power of attraction.

Furniture.

It is important, both for the strength and good effect of furniture, that the principles of sound construction be well carried out, that the construction be evident, and that if carving or other ornament be introduced, it should be by decorating that construction itself, not by overlaying it and disguising it.

It is not necessary that an object be covered with ornament, or be extravagant

in form, to obtain the element of beauty; articles of furniture are too often crowded with unnecessary embellishment, which, besides adding to their cost, interferes with their use, purpose, and convenience; the perfection of art manufacture consists in combining, with the greatest possible effect, the useful with the pleasing, and the execution of this can generally be most successfully carried out by adopting the simplest process.

The Jury, though fully sensible of the great beauty of many of the ornamental works in furniture collected at the Exhibition, yet regret that there have not been more specimens of ordinary furniture for general use; works whose merits consist in correct proportion, simple but well-considered design, beauty of material, and perfect workmanship. Few have the means of purchasing such beautiful works as the sideboard of M. Fourdinois, or the cabinets of M. Ringuet le Prince, which come almost under the head of fine art rather than of manufacture; and it is much to be desired that attention be directed towards improving the taste of those more ordinary objects that come into daily use by the many.

Cabinet furniture first became an article of general luxury about the beginning of the 16th century: at this period inlaid as well as richly-carved furniture was manufactured in Italy, and exported to various parts of Europe. Among the works now exhibited by Italy, some are distinguished by great excellence, particularly in the carved examples.

From Tuscany.—M. A. BARBETTI, of Florence, exhibits, with other things, a casket of great merit, most elaborately carved, introducing bas-reliefs of figures, ornaments, chimeras, &c.

A large cheval screen frame, in walnut wood, by LUIGI MARCHETTI, of Sienna, is very beautifully wrought with delicate ornament of good taste. An oval medallion frame, by PIETRO GIUSTI, is also a fine specimen of carving.

From Sardinia.—M. B. CAPELLO, of Turin, exhibits a very elegant inlaid table, a curule chair, and a pedestal—all ornamented in very pure taste in the Etruscan style, and of good execution.

In France ornamental cabinet-work had acquired considerable reputation in the time of Louis XIV. Its manufacturers have since then continued to produce works of great beauty, and have brought the art of marqueterie inlay to a high state of perfection; this work consists in inlaying woods of a great variety of tints in the form of flowers, ornaments, &c., and was greatly advanced in the last century by Reiser, who produced very beautiful specimens.

In buhl-work, also, wherein metals are inlaid upon grounds of tortoiseshell or ebony, or vice versâ, the French have greatly excelled. This kind of ornamental inlay takes its name from Monsieur de Boule, a celebrated French cabinet-maker in the time of Louis XIV.

In Germany there has long been established cabinet-work of a high class, more especially for those exquisite ebony cabinets, inlaid with precious stones, and various woods and metals, surmounted with carved figures, and elaborately fitted with innumerable drawers and with perspective recesses—presents fit for kings and princes: of these an excellent example is presented in the ebony cabinet of M. GRÖGER, of Vienna—a most beautiful work, exquisitely finished.

Cabinet-work of a more useful description has been carried to a high state of perfection in Great Britain, whose manufacturers have studied to produce objects

in which the prominent excellence is substantial quality and finished workmanship.

It was in England that mahogany, now so generally used, was first employed for cabinet furniture, about 1720 ; Dr. Gibbons, an eminent physician, having had some planks of this wood given to him by his brother, a West India captain, who had brought them in his vessel as ballast, wished to use them for a house he was building in King Street, Covent Garden, but the carpenters complained that the wood was too hard ; it was therefore laid aside as useless. Soon after Mrs. Gibbons wanted a candle-box, and the Doctor called in his cabinet-maker, Mr. Wollaston, to make him one of this wood, then lying in the garden. He also declared that it was too hard : the Doctor said he must get stronger tools ; the candle-box was completed and approved, insomuch that the Doctor then insisted on having a bureau made of the same wood, which was accordingly done ; and the fine colour, polish, &c., were so pleasing, that he invited his friends to come and see it. Among them was the Duchess of Buckingham : her Grace begged some of the same wood from Dr. Gibbons, and employed Wollaston to make a bureau for her also ; on which the fame of mahogany and Mr. Wollaston was much raised. The wood became the fashion, was much admired, and from that time has continued to be used for furniture more than any other.

It will not be possible to give a description of the various details of the manufacture of cabinet-work, but an account of some of the more ornamental processes and results connected with it may be desirable.

Of these, the *marqueterie* inlay is one of the most beautiful and interesting. In this work the design, having been first drawn on paper and properly coloured, is pricked with a fine needle, so that the outline of the ornament or other objects can be pounced on the various coloured woods proposed to be employed ; these outlines being carefully marked in, are cut with a fine watch-spring saw, worked in a lathe : in most cases the wood forming the ground is cut with that forming the ornament, so that a piece cut out of white wood corresponds exactly in shape and size with the opening left in black wood, in which it therefore fits and forms the required pattern.

Tarsia-work, or the art of inlaying woods, had been practised from a very early date in Italy, and extensively employed in the decoration of wall panelling ; and remains of this kind of work revived by Fra Giovanni di Verona in the 15th century still exist in some of the Italian churches.

The earlier specimens of this work were executed in woods of different shades, but natural hues ; afterwards, when flowers, birds, and coloured ornaments were introduced, various stained woods were employed ; these, in most cases, have the disadvantage of fading, but in the admirable specimens of *marqueterie* inlay exhibited by M. CREMER, of Paris, the woods are stained by the process of M. Boucherie, which is stated to give them a permanent dye to a considerable depth. Notwithstanding, however, the beautiful effect of this work, it is desirable to adopt, as far as possible, the employment of woods of natural hues, as being more harmonious and more consistent with the nature of the work.

In those ornaments which are shaded, the effect is given by immersing the pieces in hot sand. The various parts, being cut out of the required tints in the proper form, are then placed according to the design, and fixed on paper ; afterwards they

are applied like veneer to the piece of furniture ; being mounted, they are cleaned off and slightly polished, and the finer lines are then engraved.

The manufacture of buhl inlay is by exactly the same process, only that metals, tortoiseshell, and ebony are here the materials employed ; the nature of the design is somewhat different, depending more upon simple outline forms. There are many beautiful specimens of this kind of work in the Exhibition, more particularly the cabinets of M. FORTUET, of Wurtzburg, where the figures and ornaments are designed and finished with infinite talent and skill.

There is another kind of inlay applied to furniture, which may be called mosaic inlay. The beautiful boxes made in India give some good specimens of this work in ivory and metal, equalled, however, by the inlaid furniture and boxes of M. MARCELIN, of Paris ; the extraordinary table of Señor PEREZ, of Spain, gives a fine example of this style of work, executed entirely in minute portions of wood ; the same principle is carried out in a table by NYE, of Tonbridge Wells.

Where the patterns assume geometric forms, this kind of work is executed by laying together slips of wood or metal, &c., in the particular forms required ; these united slips are then cut transversely, and affixed to the grounds as in marqueterie.

Immediately connected with inlaid cabinet-work is the manufacture of *parquetterie* for floors ; in this work the same principle is carried out as in *marqueterie*, only on a bolder scale ; woods of different colours are cut to pattern, and inlaid one in the other, or so arranged as to produce very beautiful effects for floors. The specimens exhibited of MM. CONVERT and LUCAS, and M. DE KEYN, of Belgium, of MM. LEISTLER and SON, of Vienna, and of Mr. MILLER, of Russia, show the perfection to which this art has been brought.

A very beautiful novelty at this Exhibition was the introduction of porcelain, inlaid in furniture like *marqueterie*, by Messrs. RIVART and ANDRIEUX ; in these examples, not only were panels of porcelain inserted, but the painted flowers were cut to form, and inlaid like the ornamental woods. In the cabinet of Mr. DOW-BIGGIN, of London, porcelain of a very high class of art is mounted in the panels and pilasters ; and M. GAMES, of St. Petersburg, contributes a cabinet in tulip-wood, mounted in *or-molu*, containing beautiful panels in porcelain. M. RINGUET LE PRINCE has introduced carvings of ivory, mounted with *or-molu*, on one of his cabinets, with excellent effect ; and in his most beautiful ebony cabinet for medals, relieved with exquisite carvings, fine stones are inlaid so as to form part of its decoration. Many of the pieces of furniture owe much of their attraction to the metal ornaments with which they are mounted ; but the ebony cabinet of Mr. BARBEDIENNE combines, in the very element of its construction, bronze ornaments and figures of a high class of art, so arranged as to form one united whole.

Of carved furniture there are many magnificent examples in the Exhibition. In the struggle to produce objects that might be specimens of the talents of the parties employed upon them, utility and purpose have in some degree been forgotten, and works brought forward that are objects of art rather than manufacture ; still it is one of the advantages of this result that it tends to improve the art workman ; it gives opportunity for the display of his skill ; it causes a school of art to grow up and extend itself ; and if it err by excess, it at any rate creates the ability to do right. Of the carved furniture, the grand buffet of M. FOURDINOIS, of Paris, is of the highest merit ; whether for its composition, the carving of the more artistic por-

tions, or its general execution, it is a noble work. The specimens by M. LIENARD, of Paris, though not large, are of great excellence, showing to what perfection and beauty the art of sculpture in wood can be brought. A large frame in pear-tree wood, very beautifully carved by M. LESHESNE, affords another fine specimen of this branch of art.

The grand collection of furniture by MM. LEISTLER and SON, of Vienna, exhibited in four rooms, displays considerable fancy and excellent workmanship, though the ornament is far too redundant for ordinary purposes.

The grand bookcase of Messrs. HOLLAND, of London, is another example of carved furniture of a high class, and the sideboard and bookcase of Messrs. JACKSON and GRAHAM, the buffet of Messrs. COOK, of Warwick, the bed and toilet furniture of Messrs. TROLLOPE, the carved glass frame and other furniture of Messrs. SNELL, the beautiful cradle and other objects by Mr. ROGERS, a writing-table in walnut wood, with other specimens by Messrs. GILLOWS, and many works by other manufacturers of Great Britain, show that industrial art is well represented in this country.

There is another branch of cabinet-work which merits particular notice, that in which mechanical action is introduced; the specimens exhibited by MM. DAUBET ET DAUMARET, of Lyons, are most ingenious and curious; in their secretaire, which is full of contrivances, one key unlocks all the drawers; these run in the most easy and perfect manner, if touched in the slightest degree; and the closing of one particular drawer shuts and fastens all the others. M. KRIEGER, of Paris, also exhibits some furniture of excellent mechanical action, such as card-tables, toilets, &c.; and M. VON HAGEN, of Erfurt, has a cabinet of fine workmanship, in which the secret mechanism is skilfully carried out.

In the Austrian collection are some curious chairs and furniture, by M. THONET, of Vienna, in which the wood inlaid with metal lines is bent to the required forms without the usual framing.

Many excellent billiard-tables are exhibited: in one, by M. BOUHARDET, of Paris, the carving is of very beautiful design; another, by M. KNILL, of Vienna, is handsomely mounted in buhl inlay, and the inlaid cues of this manufacturer are very beautiful specimens. The billiard-tables of Messrs. THURSTON, and of Messrs. BURBOUGHS and WATTS, of London, are of simpler construction, but solid, and of excellent workmanship.

Decorations.

The specimens exhibited under this head are decorations for walls and ceilings, imitations of woods and marbles, and painted blinds.

Several of the ceilings under the galleries of the Exhibition Building have been decorated with more or less taste, principally in the Arabesque style. One, painted by Signor MONTANARI, of Milan, in one of the Austrian apartments, deserves particular notice: it is a coved ceiling, executed with great breadth of effect. The imitation of gold is excellent, and the general treatment is full of spirit and force.

In wall decoration Mr. MORANT exhibits a handsome panel, mounted with gilt ornaments and mouldings; the latter upon a ground of looking-glass. In the centre of the panel is painted a figure surrounded by foliage Arabesque.

Mr. MOXON's panelling over a chimney piece, by Mr. THOMAS, in the English Furniture Court, is a tasteful specimen of decoration; and the imitations of woods

and marbles by this gentleman are executed in a very superior manner, united with an ornamental character of a high class.

Messrs. HOLLAND, of Warwick, exhibit table-tops in imitation of marbles, ornamentally arranged in the old Italian style with good effect.

Mr. KERSHAW's imitations of woods are also very excellent; and those by Messrs. NICOLL and ALLEN, of wood and marble, have likewise considerable merit. Some of these imitations of woods are painted on glass, the polished surface of which gives great finish to the work.

Among the painted blinds, of which there are many exhibited, those by M. BACH PERES, of Paris, were considered good specimens.

The wax-cloth hangings, by M. VIVET, of Paris, are painted ornamentally in the style of Francis I., and are stated to be so prepared as to resist the effect of moisture.

Paper-hangings.

Paper-hangings form a manufacture of considerable importance, carried on in most of the principal cities of Europe, employing many artists and designers, and thousands of operatives, consuming also vast quantities of paper, colours, wool, and metal. They are important also because they may be made the means of extensively diffusing taste for art; and from the low price of the cheaper kinds, enabling the humblest mechanic to give to his home an air of elegance and comfort.

It is difficult to determine the period when paper-hangings were invented. They are supposed to have been first made in China, and the introduction of these hangings into Europe probably suggested the manufacture here.

They may be divided into three kinds—the flock, the metal, and the coloured; and each of these seems to have been invented at a different time as an imitation of a distinct material. The flock, to imitate the figured tapestries and stuffs; the metal in imitation of the gilt leather hangings; and the coloured as a substitute for painted decoration.

It is generally allowed that flock-hangings were first manufactured in England, and invented by Jerome Lanyer, who obtained a patent in the reign of King Charles I., dated 1st May, 1634, and carried on his art in London.

In this patent it is stated "that, by his endeavours, he hath found out an art and mystery of affixing wool, silk, and other materials of divers colours upon cloth, silk, cotton, leather, and other substances with oil, size, and other cements, to make them useful for hangings and other occasions, which he calleth Loudriniana; and that the said art is of his own invention."

M. Savary, in his Dictionary of Commerce, 1720, says that tonture-de-laine or flock-hangings were first made at Rouen, but in a coarse manner, being only used for grounds, on which, with flocks of different kinds, were formed designs of brocades. They essayed to imitate tapestry-hanging, but not satisfactorily; and at last a manufactory was established at Paris, in the Faubourg St. Antoine, and there flowers and grotesques were introduced with success.

The manufacture is thus described by him:—"The artist, having prepared his design, drew on the cloth with a fat oil or varnish the subject intended to be represented; and then the flocker, from a tray containing the different tints of flocks

arranged in divisions, took the colours he required, and sprinkled them in a peculiar manner with his finger and thumb, so that the various shades and colours were properly blended, and an imitation of the wove tapestry produced."

These descriptions, though detailing the manufacture of flock-hangings, yet do not allude to the use of paper as a ground, nor to blocks for printing. A French author, writing in 1723, says that paper-hangings, called tapestry in paper, were, till lately, only employed by the country people for their cottages, or by small tradesmen in their shops and rooms; but towards the end of the seventeenth century, the manufacture was raised to such a point of perfection and beauty that, besides the quantities that were exported abroad, and to the principal cities of the kingdom, there was scarcely a house in Paris not decorated with it. The manufacture at that time is thus described:—

The design, having been drawn in outline on paper pasted together of the size required, was then divided into parts of a suitable form and given to the carver or wood-engraver to cut the design on blocks of pear-tree, much in the same manner as at present. The outline thus cut was printed in ink, with a press, on separate sheets of paper: when dry, these were painted by hand in distemper colours, and afterwards joined together so as to form the required design. Grotesques and panels, in which were intermingled flowers, fruit, animals, and small figures, were then executed by the above process. M. Reveillon, of Paris, is considered to have introduced many improvements in this manufacture, and was celebrated for the beauty of his productions in the latter end of the last century. The pillage of the workshops of this manufacturer in the Faubourg St. Antoine was one of the first incidents of the Revolution in 1789.

In England this manufacture continued from the time of Lanyer, and obtained a high reputation. In 1712, a duty of 1*½*d. per square yard was imposed; and a Mr. Jackson, who established a factory at Battersea for paper-hangings of classic design in chiar-oscuro, writes, in a work published 1754, in praise of his own productions, and condemns the fanciful paper-hangings at that time so much used, comparing them with the Chinese.

In the year 1786, there was established at Chelsea a manufactory for paper-hangings of a very superior description, by George and Frederick Echarlts. Works excelling even those of the present day were produced at this place; some of the blocks used are at present in possession of the writer of this report: they have great merit in the designs, and are some of them 8 feet in length. These manufacturers carried the art to its highest point in England: they printed not only on paper, but also on silk and linen, and employed a number of artists in addition to workmen and children. M. Sheringham, of London, also excelled at that time in decorative paper-hangings.

During the present century the French have not only restored this branch of manufacture to a high state of perfection, but have also introduced many important improvements, such as the embossed flocks and the shading of flocks, the perfect imitation of chintz, improvements in the satin-grounds, and the introduction of work printed from engraved cylinders.

In England, the trade was protected by a duty of 12*d.* per square yard up to the year 1846, when the late Sir Robert Peel reduced it to 2*d.* This high duty acted almost as an exclusion to foreign makers, and there was therefore no com-

petition with them, nor any inducement to improve. Since that time, however, the English manufacturers have made great progress in their art, both in style and workmanship, the trade has greatly increased, and the improved productions are sold at a greatly reduced price. They have, besides, applied themselves to the improved application of machinery, by which very beautiful papers are made at an extremely cheap rate.

The process of manufacturing ordinary paper-hangings, as now carried on, may be thus briefly described :—

The pattern being first carefully drawn, is then pricked, and the outlines of the various tints are pounced each on a separate wood-block made of pear-tree, mounted on pine. These blocks are pressed on the sieves of colour, and then applied to the paper, each block following the other on the guide-marks left by the previous impression. An idea may be formed of the enterprise and labour required to produce some of the decorative paper-hangings for this Exhibition, by stating that more than 12,000 blocks have been employed on a single one of them.

In making flock-paper, the pattern is first printed in size, and then with a preparation of varnish or Japan gold-size. When this is partly dry, coloured flock, prepared from wools, is sifted on the varnish pattern, to which it adheres. Great improvements have been made of late years in this manipulation, more especially by French manufacturers.

Paper-hangings, where gilding is introduced, are prepared much in the same way as for flock: the leaf metal is laid on the varnish pattern, or, if worked in bronze powder, it is brushed over with a hare's foot.

The English manufacturers have attained great perfection in the preparation of metal papers. The gilding, having to encounter the damp and variable climate, is most severely tested; but by means of good material, careful manipulation, and a preparation washed over it, it remains unchanged for a considerable period.

Paper-hangings have been printed in England by means of hand-machines for many years, the papers being made in lengths of 12 yards, or single pieces, in one or two colours, and these colours falling separately on the ground. It was not until about ten years since what is now understood as machine printing was fully introduced, and this was done by Messrs. POTTER, of Darwen, who, by means of steam-power, artificial drying, and an endless roll of paper, were enabled to produce patterns with good effect by surface-roller printing in several colours, on the principle of calico printing: specimens showing 14 colours were exhibited by this house. Messrs. HEYWOOD, HIGGINBOTHAM, and Co., of Manchester, have also effected great improvements in the manufacture, and exhibit patterns showing 20 colours made by 14 rollers; and Messrs. J. WOOLLAMS and Co., of London, likewise exhibit excellent specimens made by machinery in addition to those they make by block-printing.

These machines are now each capable of printing from 1,000 to 1,500 pieces per day; and although the work is not equal to block-printing in the solidity or permanence of the colours, yet the small price at which it is produced commands an extensive sale, superseding to a great extent the cheaper kinds made by hand.

The above remarks apply only to paper-hangings of the cheaper qualities, for machine-printing has not yet been successfully applied to those with glazed or satin

grounds. There is also another evil which it is most desirable to remedy—the colours are liable to run, without great care, in the hanging.

It is perhaps impossible to give the correct statistics of the manufacture of paper-hangings. A statement has, however, been prepared with some pains by M. Zuber, of Rixheim, which approximates to the actual condition of this branch of industry in the principal countries of Europe and in the United States; but is founded on rather loose data in reference to this country, the result of whose products I am convinced it understates.

STATISTICS OF PAPER-HANGINGS, 1851.

COUNTRY.	Number of Tables.	Number of Machines.	Workmen.	Number of Pieces produced.	Value in Pounds Sterling.	Mean per Piece.
Great Britain - - -	600	—	1,900	2,300,000	£. 300,000	s. d. 2 7
Ditto - - - - -	—	20	100	3,200,000	100,000	0 7
France - - - - -	1,200	—	4,500	6,000,000	330,000	1 1
Ditto - - - - -	—	12	50	200,000	8,000	0 9½
Zollverein - - - -	300	6	1,200	1,600,000	80,000	1 0
Belgium - - - - -	150	6	600	600,000	40,000	1 4
Holland - - - - -	50	—	200	250,000	12,000	0 11
Switzerland - - -	30	—	100	100,000	4,000	0 9
Austria - - - - -	60	—	250	250,000	24,000	1 11
Piedmont - - - - -	40	—	150	200,000	8,000	0 9½
Russia - - - - -	100	—	400	500,000	60,000	2 4½
Denmark - - - - -	30	—	100	100,000	8,000	1 7
Spain - - - - -	100	—	400	400,000	28,000	1 5
United States of America	400	—	1,250	4,000,000	160,000	0 9½
Ditto - - - - -	—	40	50	—	—	—
Total - - - - -	3,060	84	11,250	19,700,000	1,162,000	—

There are very beautiful specimens of paper-hangings in the Great Exhibition; works which not only possess considerable artistic excellence, but also show great progress in the manufacture.

France has justly acquired a high renown for her works in this branch of industry. M. DELICOURT, of Paris, exhibits a tapestry-like picture entirely printed by blocks, representing a chase in a forest, surrounded by a rich ornamental frame, with pilasters containing animals, birds, and attributes of the chase: 12,000 blocks were required to execute this most creditable work. He likewise exhibits flower decorations entirely executed in flocks, of which there are about 70 different shades; also very beautifully-finished plain flock-papers, called silk and wool. His two bas-reliefs of *the Descent from the Cross* and *the Resurrection* are good specimens of printing.

M. ZUBER, of Rixheim, France, exhibits one of his beautifully-executed landscape papers—one of a series of works for which this house is so celebrated: it represents the floral vegetation of the four quarters of the globe, and the richness and brilliancy of the colouring and the perfect workmanship are alike remarkable. M. Zuber also exhibits many other excellent specimens of the various kinds of paper-hangings, &c.: he is, besides, the author of many improvements in this trade.

Messrs. MADER, of Paris, exhibit a picture representing a garden scene—a very clever example of paper-printing, left, perhaps purposely, in a state where a few touches by the hand of a clever artist would complete a beautiful effect. A well-

executed figure in a panel, and other decorations of flowers and ornaments, besides some specimens of the more ordinary kinds of paper-hangings, attest the skilled workmanship of this house.

The English manufacturers of paper-hangings have produced many beautiful specimens also, both as decorative, damask, chintz, and flock-papers; those made by machinery have been previously alluded to.

Messrs. TOWNSEND and PARKER, of London, exhibit paper-hangings of various kinds, of considerable beauty in design and execution: two of their decorations introduce fruit, flowers, and arabesque ornament of excellent execution. Messrs. HINCHLIFF and Co., of London, have also produced good specimens of decorative and other paper-hangings; and the collections of Messrs. W. WOOLLAMS and Co., J. WOOLLAMS and Co., and Messrs. TURNER and Co., include many examples, showing that the art is well carried on in this country.

Messrs. SPÖRLIN and ZIMMERMANN, of Vienna, exhibit paper-hanging decorations for ceilings, &c., in good taste. They have also adapted the process of block-printing in distemper colours, as a cheap form of illustrating works of science and art: the specimens they exhibit give illustrations of machinery in isometrical perspective, very beautifully executed.

M. DEVIS, of Brussels, exhibits a large collection of paper-hangings, more particularly in flock, of excellent execution.

MM. FETTER and RAHN, of Warsaw, have forwarded a collection of paper-hangings, which possess considerable merit, both as regards design, colouring, and execution.

Japan Ware.

The articles under this head form an interesting series, and include the products of India, China, France, Germany, and England.

Japan ware may be divided into two classes: works lacquered upon wood or metal grounds, and those formed of papier maché; these last are superior to the former, being lighter, sounder, and admitting of a more beautiful finish.

Japan ware derives its name from the lacquered ware manufactured in Japan, and introduced into Europe towards the end of the seventeenth century. The lacquered work of that country is of a superior description; some of it higher in quality even than the Chinese, which is also very beautiful, and is very extensively manufactured.

It is called lacquered ware because the articles are coated with varnish prepared from lac. This lac is a resinous gum, the sap of a shrub *Tsei-shoo* (*Rhus vernix*) in Japan, and of the *Augia Sinensis* in China; the juice thence extracted is of a poisonous nature, and great caution is required in collecting it.

The method of applying the lacquer in China is pursued as follows:—"The article to be ornamented, if formed of wood, is always very dry, light, and smooth: it is first coated with a preparation of oxgall and rottenstone; this is rubbed to a smooth face and then varnished. This varnish is thus composed: 605 grains of fine gum lac are put in 1,200 grains of water, to this is added 38 grains of oil of

* I am indebted to an article by M. Natalis Rondot of Paris, one of our Jury, for this description of the Chinese mode of jappanning.

Camellia sasanqua, a pig's gall, and 19 grains of rice vinegar. The whole is well mixed in full day-light, the lac gets deeper and deeper, and the varnish shortly becomes a brilliant black; a very thin coat of this is laid on with a flat hair-brush. The article is left in a steamy heat, and at length comes into the hands of a workman who rubs it down in water with very fine pumice. The work then receives a second coat of the lac varnish, and after that a second polish, and these two operations are successively continued till the surface is perfectly even and brilliant. As the operation advances, a still finer quality of lac is used: there are never less than three coats laid on, nor more than eighteen. The decoration of the object is confided to an artist workman, who first draws in the design with white-lead; if he is satisfied with the sketch, he engraves it, and fills in the thousand little details of the subject. There then remains only to paint with the camphorated lac of Kouang-si, which serves as a mordant on which to gild either with leaf-gold or powder. The reliefs are obtained with one or two coats of *hoa-kinn-tsi*, and these gilt designs are then enriched with the lac of *Fo-kienn*."

Little is known of the fine lacs of *Sou-tchou* and of *Nann-king*; the price is very high; this is explained by the cost of the work, which requires the application, the hardening, and the polishing alternately of eighteen or twenty coats. In their lacquered objects the purity and brightness of the varnish, the infinite minuteness of the decoration, and the finished workmanship of the furniture, are most admirable. In the work from Japan, pieces of mother-of-pearl cut to form are inlaid in the lacquered grounds, and the last coats of the varnish are polished with a reed.

Several interesting specimens of Japan ware are exhibited from China, particularly a very elaborate folding screen by Mr. BRAINE.

England has obtained some celebrity for her Japan ware executed in papier maché. About a century ago, Mr. Baskerville, of Birmingham, manufactured extensively japanned iron tea-trays, &c., and a pupil of his, named Clay, first invented papier maché, as applied to this particular manufacture in 1760, and obtained a patent for the same: to this invention is owing the importance which this branch of trade has acquired, not only from the greater perfection of form and appearance this material is susceptible of, but also from the larger variety of articles to which it can be applied.

Messrs. JENNENS and BETTRIDGE, of Birmingham and London, are the largest manufacturers of this material in England; they have been established about fifty years, and have introduced many improvements. About thirty years since they obtained a patent for a new application of pearl to Japan ware, and this firm have, from their enterprise and taste, greatly developed the trade by adapting this material to many new purposes. Tables, chairs, screens, work-boxes, inkstands, portfolios, even a piano, are among the endless variety of objects to which it is applied by them. They exhibit a very large collection of japanned ware, executed both in papier maché and other materials; the most conspicuous among them is a cottage pianoforte, of which the entire case is made in papier maché, japanned black, and inlaid with mother-of-pearl: the ornaments of this piano are in good taste and well executed, but scarcely suitable in style for the materials employed, which, being necessarily in small pieces, would have probably told with better effect if arranged in the form of mosaic. A wine-tray, and many others of the specimens where the principles of the design are perfectly flat, are excellent examples. In

some of the work-boxes, too, the introduction of the jewelled work under glass is appropriately designed and well executed, and forms a pretty addition to the papier maché. The style of work of some of the large objects, such as a reclining chair, a cot, tables, &c., however well designed and ingeniously executed, did not appear suitable to the material. The Jury nevertheless recognise the great merit due to this house, and felt pleasure in awarding the Medal.

In 1832, Mr. BRINDLEY, of Birmingham, obtained a patent for producing papier maché articles by pressure between dies, either in wet sheets or in the form of pulp; this is employed for a cheaper kind of objects.

In France this manufacture has also obtained considerable success, though there are no objects exhibited. In Holland, Belgium, the Zollverein, Austria, the art of jappanning is carried on, but not so extensively as in England.

The mode of manufacturing the papier maché Japan ware in this country may be thus briefly described:—paper of a porous texture is saturated with a solution of flour and glue, and then applied to a mould somewhat smaller than the object required; these moulds are of iron, brass, or copper: repeated layers of this paper are made to adhere by means of the glue, a drying at 100 degrees of Fahrenheit taking place between each coat. When the proper substance is obtained, it is taken from the mould and properly planed and filed to shape; the thickness of the article varies according to circumstances, an ordinary tea-tray takes about ten layers; a tar varnish, mixed with lamp-black, is now laid on, after which the article is stoved; several coats of this varnish are applied, followed in each case by a stoving. When sufficiently covered with this preparation, the inequalities are removed with pumice-stone, and the work of the artist commences; after he has executed the design, either in bronze powder, gold, or colour, as may be desired, several coats of shell-lac varnish are applied, and this is hardened in the stove at a heat of 280 degrees Fahrenheit. The article is now rubbed with rotten-stone and oil to obtain a polish, and perfected to a brilliant surface by rubbing with the hand.

Associated with the papier maché ware is the introduction of imitation jewels on coloured grounds under glass; these are cemented to the under surface of the glass, which is also diapered over with gold, and the ground is then painted the required colour, a foil being fixed behind the glass jewels.

Another variety has also been lately introduced; that, where laminæ of mother-of-pearl are fixed behind glass, and so associated with the pictures or ornaments as to produce very beautiful effects. Mr. LANE, of Birmingham, exhibits some excellent examples of this work.

Messrs. CLAY and Co., of King Street, London, are the representatives of the descendants who invented this manufacture; they exhibit a large selection of articles of papier maché, among which many of the tea-trays are of very good design and execution.

Messrs. HALBEARD and WELLINGS, of Birmingham, exhibit a handsome toilet table in the Elizabethan style inlaid with mother-of-pearl, in addition to many other specimens.

Mr. WALTON, of Wolverhampton, exhibits some tea-trays of good design, where the principle of the ornamentation is founded upon geometric forms, depending on outline and contrast of colour, not on imitation of relief. The large table in papier maché, well painted in flowers, is also a fine specimen of the manufacture.

Messrs. SPIERS, of Oxford, exhibit numerous examples of papier maché, many of them beautifully ornamented.

Messrs. BECKER and KRONICK, of Vienna, exhibit japanned screens well executed, besides other objects.

Messrs. ZEEGERS, of Amsterdam, exhibit a folding screen, in which the execution of the various details is excellent, and the peculiarities of the Chinese work admirably sustained.

This Jury feel called upon to remark on the redundancy and inappropriateness of much of the ornament applied to the European specimens of Japan ware; and to direct attention to the better examples of this work from Japan and China, where it will be found that in the subordinate parts the ornament is kept subdued and simple, thereby giving more effect to the principal features.

Ornaments in Relief Mechanically Produced.

Under this head are included ornaments in Carton-pierre, in papier maché, and in stamped leather; and carving produced by machinery. The first of these, *Carton-pierre*, has but recently been manufactured in England, although employed for nearly forty years in France; it is an important introduction for architectural decoration from its lightness, strength, facility of application, and other advantages. It is composed of the pulp of paper mixed with whiting and glue; this preparation is pressed into plaster piece-moulds, backed with paper, and then, when sufficiently set, removed to a drying-room to harden. The manufacturers of Paris have, since the invention of this material, executed in it works of great extent and beauty of design; it has the advantage over plaster of Paris, that it is stronger, lighter, and perfectly hard, and dries in a few hours.

Monsieur CRUCHET, of Paris, exhibits an enriched frontispiece, ornamented with groups of dead game, and various other specimens of great merit.

Monsieur HUBER, of Paris, exhibits a frieze of foliage ornament and children of beautiful design, and also various specimens of pilasters, ornaments, &c.

M. GROPIUS, of Berlin, exhibits several statuettes executed in this material, and also various ornaments.

Messrs. JACKSON and SONS, of London, are the first who have extensively manufactured this material in England, and have through its means been enabled to produce a series of ornaments that have added much to the character of art in this country: they exhibit many specimens; a part of their decoration at the Army and Navy Club—a chandelier—an Elizabethan ceiling, and many other objects; but one of the firm being on the Jury, they could not be rewarded by a Medal.

Papier maché, as used for architectural works in England, differs in some respects from the ordinary material known by that name. It is prepared by laying sheets of brown paper one over the other, a coat of glue being given between each. These sheets of paper thus glued together are then pressed into a metal mould of the ornament required; the papier thus stamped to shape is afterwards trimmed; a composition of the pulp of paper mixed with rosin and glue is now put in the mould before used: the papier maché ornament, previously stamped, is again inserted, and is again pressed upon the pulp composition, which thus adheres to it and produces a sharp, well-defined ornament.

Messrs. BIELEFELD, of London, exhibit many specimens of this manufacture, as do also Messrs. JACKSON and SONS, before mentioned.

Stamped Leather.

The manufacture of this material was revived about fourteen years since at Paris, with many improvements upon the old leather hangings of the seventeenth and eighteenth centuries, as regards the perfection of embossing the ornament.

The old leather hangings were made by a comparatively simple process, without the aid of machinery. The skins being properly moistened, were laid on a mould of the embossed ornament: into the various parts of this mould the leather was pressed by small wooden tools, till it acquired the embossed pattern; when dry, the leather was coated with silver-leaf, and varnished with lacquer to produce the colour of gold. After this the proper colouring was laid on by hand, and certain parts of the leather stamped by a hand-punch to produce the small figure peculiar to some kinds.

In the French revival of this manufacture the ornament is stamped by hydraulic pressure, producing very perfect and very high relief: to prevent the relief subsiding as the leather dries, the reverse of the leather is covered in the embossed parts with some composition.

Messrs. DULUD, of Paris, at present represent the house which first manufactured by this improved process: they exhibit many specimens of good design, and showing the excellence of the emboss.

Mr. LEAKE, of London, also exhibits a collection of specimens of leather embossed by the same process, many of them of good design.

Carving by Machinery.

Messrs. JORDAN and Co., of London, exhibit various specimens of carved work executed by machinery,—a large Gothic oak screen, dead game, foliage, &c. The operation of this machine is by a series of drills, pointed from a model: where there is a considerable repetition of the same ornament, this machinery can be employed with very great economy, but the work requires finishing by hand.

Conclusion.

The Jury have carefully examined the various works in this class, numbering probably more than five thousand objects; there were many works of very considerable cost and labour, which they would have been pleased to reward if they could have done so conscientiously, but they considered that it was not the size or the amount of labour in the object that should entitle it to distinction, but rather the merit of pure design, of execution, or of contrivance.

The Jury unanimously regretted the withdrawal of the Third Medal; if this had been retained they would have been able to discharge their duties more satisfactorily to themselves, and they think also to the exhibitors. They are bound to add, that they were only empowered to recommend certain names for the distinction of the First or Council Medal, and that the Council made a selection from that list.

THE COUNCIL MEDAL.

Nation.	Number in Catalogue.	Name of Exhibitor.	Objects Rewarded.
France - - -	1709	Barbedienne and Co. -	Ebony bookcase, mounted with bronze.
France - - -	1715	Delicourt, E. - - -	Paper-hangings.
France - - -	1231	Fourdinois, A. G. - -	Carved sideboard of walnut-wood.
Austria - - -	633	Leistler, C. and Son -	Carved furniture in four rooms.
France - - -	1326	Liénard, M. J. - - -	Clock-case, and other articles.

THE PRIZE MEDAL.

Tuscany - - -	74	Barbetti, A. - - -	Carved coffer.
Bavaria - - -	67	Barth, Brothers - - -	Lady's work-table.
Belgium - - -	439	Beernaert, Antoine -	Oak cabinet.
France - - -	1077	Bellangé, A. L. - - -	Inlaid buhl furniture.
France - - -	1106	Bouhardet, C. P. - -	Carved billiard-table.
France - - -	778	Bourgery, Madame - -	Models, (carton-pierre).
China - - -	-	Braine, C. T. - - -	Japanned screen.
United Kingdom	4	Burroughes and Watts	Billiard-table.
Sardinia - - -	64	Capello, G. - - -	Inlaid table, chair, and pedestal.
United Kingdom	110	Cookes and Sons, of Warwick (Class XXX.)	Carved sideboard.
Belgium - - -	404	Couvert and Lucas -	Mosaic floor and table.
France - - -	1573	Cremer, J. - - -	Marqueterie inlaid furniture.
France - - -	810	Cruchet, V. - - -	Carton-pierre and carving.
France - - -	1579	Dubet and Dumarest -	Cabinets with mechanical action.
Belgium - - -	406	De Keyn, Brothers - -	Mosaic Floor.
China - - -	-	Dent, L. - - -	Bedstead.
India - - -	-	Deonarain Singh - -	Bedstead.
United Kingdom	122	Doveston, G. - - -	Cabinet and chair.
United Kingdom	404	Dowbiggin and Co. - -	Inlaid cabinet, ornamented with por- celain.
France - - -	1207	Durand, E. P. - - -	Cabinets, &c.
Bavaria - - -	69	Fortner, F. X. - - -	Inlaid cabinet.
Russia - - -	297	Gambe, - - -	Cabinet, ornamented with porcelain.
United Kingdom	186	Gillow and Co. - - -	Writing-table.
Tuscany - - -	117	Giusti, P. - - -	Carved frame.
Austria - - -	631	Grüger, F. - - -	Ebony cabinet, inlaid with marble, &c., and ornamented with carved figures.
Prussia - - -	226	Gropius, P. - - -	Carton-pierre, figures, &c.
Prussia - - -	770	Hagen, A. von - - -	Cabinet.
United Kingdom	244	Hayball, Arthur (Go- vernment School of Design, Sheffield).	Cabinet.
United Kingdom	407	Holland, W., of War- wick.	Table-tops, in imitation of marble.
United Kingdom	161	Holland and Sons, of London.	Carved bookcase.
United Kingdom	345	Hoyles, Henry (Go- vernment School of Design, Sheffield).	Sideboard.
France - - -	879	Huber, J. - - -	Carton-pierre.
United Kingdom	261	Jackson and Graham -	Carved sideboard, and other furniture.
France - - -	889	Jeansolme, J. P. F. -	Cabinet and sofas.
United Kingdom	187	Jennens and Bettridge	Inlaid Japan pianoforte case.
United Kingdom	10	Johnstone and Jeanes -	Expanding table.
France - - -	890	Jolly-Leclerc, - - -	Cabinet work.
United Kingdom	80	Jordan, T. B. (Main Avenue, West).	Oak screen, &c., carved by machinery.
United Kingdom	1	Kershaw, T. (Class XXVII.)	Imitation of marbles and woods, for house decoration.

THE PRIZE MEDAL—continued.

Nation.	Number in Catalogue.	Name of Exhibitor.	Objects Rewarded.
France - - -	282	Knecht, Emile - - -	Carved figures.
Austria - - -	632	Knill, J. - - -	Billiard-tables and cues.
France - - -	1283	Krieger and Co. - - -	Card-tables and mechanical furniture.
United Kingdom	128	Lane, T. - - -	Paintings on pearl glass.
France - - -	573	Lechesne, A. - - -	Carved frame.
France - - -	327	Mader Brothers - - -	Paper-hangings.
France - - -	606	Marcelin, — - - -	Inlaid mosaic table.
Tuscany - - -	79	Marchetti, L. - - -	Carved frame.
France - - -	927	Mercier, P. E. - - -	Ebony cabinet.
Russia - - -	299	Miller, G. jun. - - -	Inlaid floor.
Austria - - -	738	Montanari, A. - - -	Painted ceiling.
United Kingdom	164	Morant, G. J. - - -	Decoration and furniture.
United Kingdom	262	Moxon, C. - - -	Imitation of inlaid marble, for decoration.
Spain - - -	271A	Perez* and Co. - - -	Table of inlaid wood.
Hamburg - - -	69	Plumbeck, C. P. H. - - -	Inlaid table.
France - - -	1410	Protot, L. H. E. - - -	Collection of inlaid furniture.
India - - -	-	Reade, C. W. - - -	Carved box.
Russia - - -	262	Rhan and Vetter - - -	Paper-hangings.
United Kingdom	207	Richardson, C. J. - - -	Collection of furniture and designs.
France - - -	1437	Ringuet-Leprince, E. - - -	Carved cabinet for medals.
France - - -	1439	Rivart and Andrieux - - -	Furniture inlaid with porcelain.
United Kingdom	353	Rogers, W. G.* (Class XXX.)	Carved cradle.
United Kingdom	264	Rogers and Dear - - -	Bedstead.
Austria - - -	651	Spörlin and Zimmermann.	Application of block printing, to illustrate works.
France - - -	1556	Tahan, A. - - -	Ornamental cabinet work.
France - - -	1499	Théfret, J. - - -	Inlaid cabinet.
Austria - - -	641	Thonet, M. - - -	Chairs, (bent wood).
United Kingdom	17	Thurston and Co. - - -	Billiard-table.
United Kingdom	318	Townsend, Parker, and Townsend.	Paper-hangings.
United Kingdom	162	Trollope and Sons - - -	Ornamental furniture.
United Kingdom	160	Wills and Bartlett - - -	Bookcase and candelabra.
Netherlands - - -	96	Zeegers, F. - - -	Japanned screen.
France - - -	1536	Zuber, J. and Co. - - -	Paper-hangings.

HONOURABLE MENTION.

United Kingdom	303	Arthur, T. - - -	Decoration.
France - - -	1061	Bach-Péres - - -	Transparent patent blinds.
France - - -	1066	Baluy, jun., J. P. - - -	Chairs by mechanical process.
United Kingdom	166	Banting, W. and T. - - -	Collection of furniture.
Austria - - -	643	Becker and Kronick - - -	Japanned screen.
United Kingdom	208	Caldecott, Messrs. - - -	Sideboard.
Sardinia - - -	68	Ciando, J. - - -	Inlaid table.
United Kingdom	189	Clay and Co. - - -	Articles in papier maché.
France - - -	1159	Cordonnaier and Co. - - -	Bookcase.
Belgium - - -	421	Deruelle-Delevoye, F. - - -	Circular mechanical buffet.
France - - -	815	Descartes, J. - - -	Mechanical sofa.
Belgium - - -	401	Devis, E. - - -	Paper-hangings.
France - - -	1202	Duhud, J. M. - - -	Embossed leather hangings.
United Kingdom	67	English, E. P. - - -	Cabinet work.
Tuscany - - -	1284	Falcini, Brothers - - -	Chair.
France - - -	1x19	Feure, Jean Marie - - -	Chairs.
France - - -	23	Florange, jun. - - -	Bedstead, &c.

* These Exhibitors have been awarded a Prize Medal, Class XXX., in whose list their names appear.

HONOURABLE MENTION—*continued.*

Nation.	Number in Catalogue.	Name of Exhibitor.	Objects Rewarded.
Switzerland - -	224	Fluekk, John (Brience)	Carved table.
United Kingdom	24	Galli and Cotti (Bay M.)	Ceiling decorations.
France - - -	1714	Genoux, F. - - -	Paper-hangings.
France - - -	1254	Graté, L. - - -	Inlaid table.
United Kingdom	131	Halbeard and Wellin	Papier maché toilet-table, &c.
United Kingdom	197	Hanson, S., and Sons	Carved mirror frame.
Cape of Good Hope.	57	Hart, J. - - -	Chair.
Bavaria - - -	73	Hartmann, J. J. - -	Parquet floor.
China - - -	-	Hewett and Co. - -	Collection of Chinese furniture.
United Kingdom	71	Heywood, Higginbottom, Smith, and Co.	Paper-hangings produced by machinery.
United Kingdom	310	Hinchcliff and Co. - -	Paper-hangings.
Prussia - - -	773	Hoffmeister, T., & Co. -	Sideboard.
United Kingdom	902	Hunter, W. J., R. & E.	Chairs.
France - - -	1276	Jouseline, A. Jun. - -	Chairs.
United Kingdom	321	Ingram, J. W. (Class XXX.)	Ornamental cabinet.
Spain - - -	285	Jimenez, M. - - -	Inlaid panel.
United Kingdom	70	Jones, A. J. (Class XXX.)	Bog yew furniture (Fine Arts Court).
France - - -	554	Kissel, J. - - -	Mechanical bed.
Austria - - -	645A	Kolbel, B. - - -	Oval mirror frame.
France - - -	1297	Laurout, François - -	Parquet floor, and frames.
United Kingdom	63A	Leake, F., and Co. (Class XXX.)	Embossed leather hangings (Fine Arts Court).
United Kingdom	203	Levien, J. M. - - -	Sideboard.
Tuscany - - -	87	Maggiorelli, Brothers -	Inlaid table-tops.
France - - -	600	Marguerie, - - -	Paper-hangings.
Belgium - - -	409	Menge, A. G. - - -	Gothic canopy.
United Kingdom	211	Minter, G. - - -	Invalid couch.
United Kingdom	69	Nicol and Allen (Class XXVII.)	Imitation of woods.
United Kingdom	54	Nye, E. - - -	Wood mosaic table.
Austria - - -	637	Pálhuber, V. - - -	Work-table.
United Kingdom	74	Potter, C. H., and E. -	Machine-made paper-hangings.
India - - -	-	Pugh, D. - - -	Indian carved furniture.
United States -	193	Ragan, W. - - -	Mechanical reclining chair.
Hamburg - - -	70	Rampendahl, H. F. C. -	Cabinet.
Belgium - - -	419	Roulé, A. F. - - -	Gothic sideboard.
United Kingdom	456	Simpson, W. B. - - -	Decorations.
Sardinia - - -	71	Speich, P. - - -	Carved ebony table.
Austria - - -	638A	Speluzzi - - -	Buhl table.
United Kingdom	70	Spiers and Son - - -	Articles of papier maché.
United Kingdom	108	Stalon, J. (Class XXX.)	Inkstand.
United Kingdom	9	Taylor and Sons - - -	Cabin furniture in Cork.
United Kingdom	178	Toms and Luscombe -	Buhl pedestals.
Tunis - - -	-	Tunis, the Bey of - -	Gates.
United Kingdom	320	Turner, H. N., and Co.	Paper-hangings.
France - - -	734	Vivet, E. T. - - -	Wax-painted cloths.
United Kingdom	60	Walton, F., and Co. (Class XXII.)	Japanned ware.
United Kingdom	179	Watson, G. - - -	Inlaid work.
Switzerland - -	237	Wettli, M. L. - - -	Carved table.
Wurttemberg -	70	Wirth, T. F. - - -	Writing-table.
United Kingdom	322	Woollams, Jno., and Co.	Paper-hangings.
United Kingdom	309	Woollams, W., and Co.	Paper-hangings.
United Kingdom	19	Wynne and Lumsden -	Carved oak chimney-piece.

London, January 1852.

 PROFESSOR ROESSER, } Joint Reporters.
 J. G. CRACE, }

CLASS XXVII.

REPORT ON MANUFACTURES IN MINERAL SUBSTANCES, USED FOR BUILDING OR DECORATIONS; AS—IN MARBLE, SLATE, PORPHYRIES, CEMENTS, ARTIFICIAL STONES, CLAY, &c.

Jury.

BENEDETTO PIETRUCCHI, *Chairman*, Italy; Royal Mint; Her Majesty's Chief Medallist.

LORD SUDELEY, *Deputy Chairman*, 35 Dover Street.

D. T. ANSTED, F.R.S., *Reporter*, 17 Manchester Street, Manchester Square; Professor of Geology, King's College.

BERNARDO DI BERNARDES, Austria; 43 Clarges Street; Architect.

GEORGE GODWIN, F.R.S., 24 Alexander Square, Drompton; Architect.

SIR CHARLES LEMON, Bart., F.R.S., M.P., 46 Charles Street, Berkeley Square.

EMMANUEL PSYCHA, Greece; Civil Engineer, and late Professor of Physical Sciences.

VISCOUNT HERICANT DE THURY, France; Member of Institute.

Associates.

F. BARKER, 71 Lower Grosvenor Street.

T. H. HENRY, F.R.S., 18 Lincoln's-Inn-Fields; Analytical Chemist.

GEORGE LOWE, C.E., F.R.S., 39 Finsbury Circus; Engineer to Chartered Gas Company.

THE objects taken into consideration by the Jury of Class XXVII., and defined by the general term *Mineral Manufactures*, have been understood to embrace a very great variety of articles manufactured in stone, marble, and clay. These may be, conveniently enough, grouped into two principal divisions: the one including all dressed, carved, sculptured, and polished work in solid material; whether stone, marble, granite, or other mineral substance; and whether solid, wrought, or inlaid in stone; while the other includes modelled and moulded work in clay, cement, certain kinds of glass and pottery, and artificial stone. The difference is essential between these two kinds of work, which are rarely undertaken by the same artist. Each of these divisions is capable of arrangement into groups, as follows:—

DIVISION I.—*Works in Solid Material.*

Group 1. Unpolished stone.

„ 2. Polished and inlaid work in stone, marble, granite, and *pietra dura*.

DIVISION II.—*Works in Plastic Material.*

Group 3. Cements and artificial stone.

„ 4. Clay.

To these there may also be added a group of miscellanea, which will not be found very numerous.

It will be convenient still further to subdivide these groups in speaking of the exhibitors, *seriatim*, and the lists may be arranged in the following order:—

DIVISION I.

Group I.—MANUFACTURES IN UNPOLISHED STONE.

- A. Flagstones, pavements, &c., roughly dressed.
- B. Carved and sculptured works in freestone, granite, &c.
 - a. Large monumental works.
 - b. Smaller works in granite.
 - c. Works in Caen stone.
 - d. Works in Bath stone.
 - e. Sundry works in freestone.
- C. Slate.
- D. Sundry materials.

Group II.—MANUFACTURES IN POLISHED STONE, MARBLE, AND OTHER SIMILAR MATERIALS.

- E. Manufactures in marble and alabaster.
 - a. Collections of marble.
 - b. Chimney-pieces.
 - c. Columns, pedestals, &c.
 - d. Slabs, tables, &c.
 - e. Sundry objects.
- F. Works in ornamental stone, granite, and spar.
 - a. Serpentine, granite, and porphyry.
 - b. Jasper, jade, agate, crystal, and spar.
- G. Mosaics, or inlaid work in stone.
 - a. Inlaid work in *pietra dura*.
 - b. Inlaid work in marble.
 - c. Inlaid work in malachite.
- H. Polished and enamelled slate.

DIVISION II.

Group III.—MANUFACTURES IN CEMENTS, SCAGLIOLA, AND ARTIFICIAL STONE.

- I. Massive and encrusted cements, scagliola and plasters.
 - a. Hydraulic cements.
 - b. Plasters and scagliola.
 - c. Artificial stone with silica base.
 - d. Bituminous cements.
 - e. Metallic cements.
- K. Glass and porcelain mosaics (including Roman mosaic).
 - a. Roman and Venetian mosaic.
 - b. Porcelain mosaic.

Group IV.—MANUFACTURES IN CLAY.

L. Bricks and tiles.

M. Terra cottas.

N. Fire-clay goods, unglazed.

O. Glazed fire-clay goods.

It will at once be seen from this arrangement how considerable a variety of subjects must be treated of in this Report, and the important relation they bear to almost all questions of construction and decoration. With the exception of those building stones which are included in Class I. as "raw materials," the whole series of non-metallic mineral substances used for construction and decoration, may be considered as referred to Class XXVII., and it will be found that many manufactures of great interest require to be described and discussed.

The Reporter—not having the requisite technical and statistical knowledge of all these manufactures, himself—has endeavoured in various cases to obtain it from authentic sources; and where any new method has been introduced by exhibitors, he has attempted to make himself acquainted with it. He has also tried to obtain and communicate information, wherever there appeared anything remarkable in the manufacture, even where this was not, in any sense, new. The Report will thus contain the result of various inquiries, as well as the observations of the Jury, on the different objects considered worthy of special notice.

In order to assist them in coming to a right decision on some subjects as to which they required technical information, the Jury have called in, as Associate Jurors, the following gentlemen, to whom they beg, here, to offer their best thanks for the valuable assistance rendered:—

F. BARKER, Esq., for polished marble and inlaid work.

T. H. HENRY, Esq., F.R.S., for chemical utensils.

GEO. LOWE, Esq., C.E., for fire-clay goods.

It is difficult, amid such a multitude of objects, of natures so widely differing, to offer any useful general remarks on the whole Class. Apart from the works forwarded by English exhibitors, whose number more than equals that from all other countries together;—(and who have sent much that is interesting in carved stone, slate, granite and porphyry, serpentine, mosaic work, cement and scagliola, bricks, fire-clay goods, and salt-glazed ware;—) it may, however, be well to allude particularly to the malachites and jaspers of Russia; the mosaics of Italy and India; the bricks of Austria; the carved stone of Malta; and the terra cottas of France, as among the most important of the objects exhibited from abroad. The selection of material, and the method and perfection of the workmanship, have generally entered into the consideration of the Jury, as well as the adaptability of the material and the economical production of a useful manufacture; and thus it will occur that here, as in other cases, similar prizes have been awarded to objects of very different degrees, as well as different kinds of merit.

In their recommendation of objects for the Council Medal, the Jury have thought it their duty to limit themselves to such as exhibited decided novelty, in addition to great merit of design and execution. The claims of the SOCIETY FOR THE IMPROVEMENT OF THE DWELLINGS OF THE LABOURING CLASSES are so considerable in both respects, as well as in an economic point of view, that they have

been at once admitted. They involve a vast improvement in style, safety, and cheapness in the construction of dwelling-houses, and this in the very cases where improvement was most needed, and most likely to conduce to decided sanitary improvement among the great masses of town populations.

To Mr. MINTON (86) we are indebted for introducing very many and important improvements in encaustic tiles, thus restoring a manufacture which had long been extinct, by the application of a method more generally available than that originally adopted; and to his enlightened appreciation of merit many modern improvements in pottery are due:—these claims were fully recognised by the Jury and group of Juries, who recommended the award of a Council Medal, which was conceded by the Council of Chairmen jointly with that recommended by another class (Class XXV.) for articles directly connected with the manufacture of porcelain.

With regard to the manufacture of Roman mosaic it need not be inquired whether the finished work of art by the Cavalier BARBERI (Rome, 15), selected as also worthy of the Council Medal is really the most perfect in its kind, or more excellent, both in design and execution, than any that exists in this country; since we may safely say that it is of the very highest order of merit, while the manufacture itself, though not modern, nor involving any peculiar novelty, has in this case the advantage of originality of design and great ingenuity in treatment and execution.

The remaining group of objects to which a similar reward has been voted, namely, the collection of Russian malachites exhibited by the Messrs. DEMIDOFF (Russia, 323), offers examples of a manufacture remarkable not only for the rich magnificence of the articles, but also for a great improvement in style and execution which will be afterwards explained; so that little doubt could exist as to the propriety of rewarding the exhibitors with a peculiar mark of distinction.

If it had been possible to do so, the Jury would also have been glad to mark in the same way the great importance they attach to the extensive and admirable manufacture of bricks, belonging to Mr. MIESBACH, of Vienna; to the remarkable works in jasper and hard porphyry, exhibited from Russia and Scandinavia; and to some of those beautiful and admirable works in *pietra dura*, sent by the Florentine artists; but the regulations not admitting of this, they can only here allude to these objects as among the most remarkable in their class, and proceed at once to discuss the various groups of objects in regular order, stating the reasons which have guided them in recommending some for reward.

Before concluding these preliminary remarks, the Jury wish to record their admiration of the rare works of manufacture belonging to this Class, exhibited by the Honourable East India Company. Among the various examples of inlaid work in *pietra dura*, not one is more perfect in its kind, or exhibits more delicate and artistic taste, or greater mechanical excellence, than a small chess-table in their collection. Next to this, they may mention as remarkable for delicacy of workmanship, the manufactures in a peculiar white marble of considerable beauty, cut into garden-seats, &c., and also many smaller objects and utensils hardly less striking. The cups and other vessels, and various ornaments, manufactured of jade and crystal, and for the most part inlaid with rubies, and emeralds, are examples of great labour and ingenuity applied to a manufacture rare in this country, and in Europe generally, but long known and

exercised in the East. For these, and many other manufactures, the Exhibition is indebted to the exertions made by the officers of the East India Company, acting on the instructions received from the Court of Directors in England. The Jury regret, however, that their ignorance of the names of the manufacturers has prevented them, in many cases, from rewarding them with Medals and Honourable Mention.

DIVISION I.—WORKS IN SOLID MATERIAL

Group I.—MANUFACTURES IN UNPOLISHED STONE.

The total number of exhibitors in this group is upwards of eighty, of whom about sixty are British, five Maltese, and a few from India. The remainder are distributed as follows:—Five French, two Belgian, two Italian, and one from Austria, Sweden, Spain, China, and the United States. The objects being for the most part heavy, and of rather large dimensions, the cost of transport has no doubt checked the transmission from a distance of many that might otherwise have been sent. But it must also be stated, that several of the raw materials properly referred to Class I. might have come under consideration here if they had not been so manifestly connected with that Class; while, on the other hand, some, though but few, of those now regarded as sculpture, &c., might almost be claimed for the present Class and group.

Many of the most interesting objects are of very great—almost national—importance, and some are certain to have attracted much notice; others again are small, and offer little at first that is likely to command attention.

A. FLAG-STONES, PAVING-STONES, &c.

Most of these objects may be considered as partly referable to Class I., and are reported on by the Jury for that Class, so far as the nature and value of the raw material are concerned. At present it is rather in reference to the method of manufacture and relative value when made into pavement, that they have to be considered; and the reader is referred to the annotations in the Illustrated Catalogue for some information regarding the nature and geological position of several of the more interesting among them.

The British paving-stones exhibited may be grouped as follows:—(1.) Yorkshire flags. (2.) Caithness flags, and Arbroath pavement. (3.) Manx flags. (4.) Irish flags. (5.) Welsh flags. (6.) Welsh road material from Penmaen-mawr; and (7.) Scotch granite paving. Some road-stuff is also exhibited in a rough state from several localities in Cornwall, but more as samples of what is already well known and used than illustrations of any new material or locality.

The Yorkshire flags—paving-stones of great importance in England—are obtained chiefly from a part of the carboniferous system of rocks developed in various parts of the county. They are remarkable for size, hardness, and toughness. The only exhibitors of such stones on a large scale are Messrs. BROWN, RUSBY, and BOOTH, of Sheffield (Outside, 29)* who are Honourably Mentioned on account of excellence of material and its adaptability to the required use.

* The Reporter has found it difficult to obtain definite information with regard to this very important product of Yorkshire. By inquiries made with the kind assistance of T. Wilson, Esq., of Crumblen House, Leeds, assisted by the Rev. T. Thorp, he has obtained a list of ninety-two quarries in the vicinity of Leeds, Bradford, Wakefield, and Halifax, occurring in a

The Caithness flags and Arbroath pavement are obtained from the old red sandstone rock, developed in the north and east of Scotland. The former consist of dark-coloured and bituminous schists, slightly micaceous and calcareous, abounding near Thurso, and remarkable for toughness and durability. The latter are also rather dark-coloured, although much paler than the Caithness, and are of very different quality; but they are also derived from the lower part of the old red sandstone series. Few flags are more useful than these, and they are happy illustrations of the excellence of the old red sandstone, generally a barren rock, for at least some important purposes. The Jury think it right to direct special attention to Mr. SINCLAIR's large series of the Forss Rockhill flags from Caithness (Outside, 13), and also to Mr. CARNEGIE's series of Arbroath flags (Outside, 20), as in both cases offering excellent specimens on a large scale, of a very useful material. For this reason they consider that both are deserving of Honourable Mention.

The Manx flags of QUILLIAM and CREER, although not exhibited so largely, are worthy of being alluded to in this place. The following information has been obtained from the Rev. J. G. Cumming (Vice-Principal of King William's College, near Castletown, Isle of Man), who has strenuously exerted himself to obtain a fair representation of the industrial products of the island, and who writes as follows:—"The black flagstone of Poolvash" (found on the south side of the island, near Castletown, and belonging to the carboniferous limestone), "is a bed whose thickness varies from a few inches up to 20 feet. It is too soft to take a polish, and is generally finished with lamp-black and oil, or, in some cases, with French polish. It is very easily wrought, and its durability is well seen in the steps of St. Paul's Cathedral (presented about the commencement of the last century, by Bishop Wilson)." Messrs. Quilliam and Creer have the lease of the quarries from the Crown, and their works are in Castletown, on the sea-shore, at a convenient place for shipment. The cost of the plain slabs for hearths, &c., at the place of shipment, is 10*d.* per square foot. Inlaid with a hard composition in patterns, as exhibited in Class I., No. 151, the cost for the same pattern as the national tile, is 2*s.* 3*d.* per square foot.

Besides the bituminous limestone, there is a flagstone worked at Spanish

thickness of from five to six hundred yards at the bottom of the coal measures, and upwards of fifty of them supplying flags and landings. The stones known as Yorkshire stones may be divided into two classes, called respectively gritstones and freestones, the latter being also sometimes called delf. Of one of these, the Bramley Fall stone (Class I. 190), is a fine example, being coarse-grained, hard, shining, and containing mica, obtained in large blocks but not laminated. The true flags are illustrated as raw material in Class I. 172, Elland flagstone, &c.; the specimens being fine grained, laminated, and cleaving into flags varying in thickness from two to three, six, or eight inches. It is stated by Mr. Wilson, that all the beds from the millstone grit upwards to the Barnsley thick coal are freestones, stratified and often splitting on the planes of stratification and alternating with beds of coal. Between the best flagstones and the millstone grit are some of the coal seams, such as the Halifax coal and the Halifax soft coal. The flagstones are of course those beds most remarkable for their fissile character, perfect evenness of texture, fineness of grain, toughness and hardness, and in many cases they can be obtained of very large dimensions. Leeds may be considered the centre of the district supplying the greatest quantities. The quarrying and dressing of these stones require some practice and ingenuity, and the specimens laid down outside the Exhibition Building, and exhibited by Messrs. Brown, Rusby, and Co., are of very good quality.

Head, not far from Castletown, obtained from rocks of the older Silurian date. Though soft and slightly elastic, and worked with great facility, it is very durable, as shown by the Runic monuments in various parts of the island. It has been used for flooring, and is admirably adapted for prison-cells. In addition to these materials, the granite of the island is considered to be very useful for curbstones and paving.

The Irish flags exhibited are few, and hardly sufficient to justify any extended description. The principal are those sent by Mr. FRANKLIN, of Galway, and appear to be of good quality (Outside, 17).

The Welsh paving-stone from Penmaen-mawr is remarkable as being both the hardest and toughest material for road-stuff that has yet been discovered. It is indeed so hard as to assume a glassy surface after long-continued exposure, and actually becomes dangerous from this cause. It is a trap-rock, and appears to be abundant. Mixed with less hard material, it might in many cases be a most useful addition to our present resources in London.

The specimen of Scotch granite paving exhibited by Mr. SIM (Class I. 137) is of excellent quality, and is well put together. It involves a new mode of construction, and is well executed. The material is adapted to withstand much wear, and the method of laying down is novel in design, whatever the opinion may be as to its applicability. The Jury have made Honourable Mention of the pavement of this exhibitor, as well as that of Mr. SINCLAIR, as both of them exhibit, to some extent, finished constructions, or working models of such objects.

Some beautiful specimens of slate flags from the quarries at Festiniog, North Wales, are worthy of Honourable Mention (awarded a Prize Medal by Class I.) and careful attention, as presenting a cheap and admirable pavement of great beauty, and in slabs so large as to prevent much chance of an irregular surface being produced when much used. The flags are of fine quality, and have had a severe trial at the Transept entrance of the Building, where some millions of footsteps have hitherto failed in producing any mark of unequal wear.

It is not astonishing that material of the kind we are now considering hardly appears except from the various parts of our own country. One firm from Belgium, Messrs. ZAMAN (136), have forwarded models of paving-stones and other manufactured stone of this kind, and of them the Jury make Honourable Mention.

A pavement is exhibited by M. DESAUGES (France, 1184), manufactured of a stone called *Pierre de Tounerre*. It is in compartments, tolerably large, and well executed, the material being well adapted to the purpose. The same exhibitor sends also a chimney-piece and other works, which will be described elsewhere.*

B. CHISELLED, CARVED, AND SCULPTURED STONE-WORK, NOT POLISHED.

a. Large Monumental Works, chiefly constructed of Granite.

These noble monuments, of excellent material and good workmanship, and remarkable for the public spirit which induced their respective owners to incur very great expense in preparing and transmitting them, may be considered

* Vide page 1226.

as permanent records of the good feeling that has been perhaps the most characteristic feature throughout the preparation of the Great Exhibition. Three of these objects, of large size, are from Cornwall, and are fine specimens of the granites of that county. Another is a highly interesting and more finished specimen of Swedish granite, by no means so large as the former, but hardly less remarkable. There is also one exhibited in the Nave, constructed of Caen stone.

The granite column sent by the CHEESEWRING GRANITE COMPANY (Outside, 54), is a very beautiful specimen of a stone obtained from quarries hitherto little worked, on property belonging to the Prince of Wales, near Liskeard, Cornwall. The shaft, cut from a single block, and worked at the quarry, is highly creditable; and the pedestal and base, worked in London, are in good proportion and well executed. The capital is rather heavy. The total height of the column, pedestal, and base, is about 30 feet. For the material, style, and workmanship of this column the Jury have awarded a Prize Medal.

The obelisk sent by Messrs. W. and J. FREEMAN (Outside, 14), is from Lamorna granite quarries, Cornwall, well known for their excellent material. Its height is upwards of 22 feet, and its weight 21 tons. It is placed on a block of Carnsew granite, weighing 31 tons. The difficulties and expense incurred in quarrying, removing, and placing objects of these enormous dimensions can hardly be judged of by those who merely see the finished result. The preparation and erection of an obelisk, formerly the work of years, and still involving enormous labour and trouble, was, in this case, completed within a few months, merely as a sample of the nature of the material and the resources of the exhibitor. A Prize Medal has been awarded for this work.*

Mr. HOSKEN's obelisk (Outside, 75) is from No. 2 granite quarry in Carnsew, near Penryn, the property of the exhibitor. It is 18 feet high, about 3' 5" square at the base, and 1' 6" square at the top. The weight is about 8 tons, and it stands on a granite block from No. 14 quarry in Killieven, in the parish of Constantine, also weighing about 8 tons. Both granites are of excellent quality, that of the obelisk more especially, the grain being fine, and the colour very good. A Prize Medal has been awarded.

The cross exhibited by Mr. KULLGREN (Outside, E. 100, and Sweden, 118), and worked from a single block of granite, is remarkable for the extreme fineness and closeness of grain of the stone, and the delicacy of finish which its texture permits. The stone is obtained from extensive quarries on the island of Malmö, on the west coast of Sweden, whence the transport to this country is easy and cheap. It bears a high polish, and the cost of wages in the district whence it comes being very low, there is good reason to believe that it might be exported with advantage. The actual cost of a similar object has not, however, been ascertained. The Jury have awarded a Prize Medal to the exhibitor of this monument.

* It was probably owing to some accidental misapprehension of the state of the case that the Medal awarded to Messrs. Freeman for their noble collection of building stones in Class I. was withdrawn in favour of the obelisk in Class XXVII. The Jury of Class XXVII. awarded the Medal for the obelisk as a manufactured block of granite remarkable for its dimensions; but according to the general rule adopted in other similar cases, the award of Class I. should have been retained, the Exhibitors being merchants and not manufacturers.

b. Smaller Miscellaneous Works, in Granite, Porphyry, &c.

Concerning these objects, the Jury have but few remarks to offer. The cenotaph exhibited by Messrs. POILLEU BROTHERS (France, 962), to which the Jury have awarded a Prize Medal, is a small object constructed of a kind of greenstone trap, whose chief merit arises from the difficulty of working a material so hard and tough. The style selected is impure Gothic, with several figures, and some open work. The execution is more elaborate than successful, and the work is left with a smooth face, without any attempt at further detail. Some of the small figures are fairly sculptured. The colour and general effect are not very pleasing. The establishment of these exhibitors is in the west of France, whence the material is obtained.

A head-stone of Aberdeen granite, manufactured by Mr. I. WRIGHT (43), is a beautiful specimen of material, admirably worked, and is worthy of special notice, as designed in good taste, well executed, and well adapted for its object. The Jury make Honourable Mention of this object, considering it as highly creditable to the manufacturer.

The bust and pedestal of blue Peterhead granite, worked and exhibited by Mr. JOHN HUTCHISON, of Monymay, near Peterhead (Class I. 161), is also a creditable and interesting specimen of its kind. Its object is chiefly to show the adaptability of a stone of excellent quality and great hardness to purposes of art exposed in the open air in cities; and the Jury consider it worthy of Honourable Mention, especially as they learn that it has been very rapidly executed, under circumstances of some difficulty, by a young man who had not before attempted anything of the kind. The cost of granite statues has been stated by Mr. C. H. Smith* as nearly the same as that of bronze, and their durability, when exposed to the smoke and acid vapours of a town, is very much greater.

The slab of granite from Craignair, near Dalbeattie, exhibited by the proprietor, WELLWOOD MAXWELL, Esq. (Class I. 134), is from a well-known quarry of excellent material, adapted for ornamental architecture. The composition is a gray quartz, with white or flesh-coloured felspar, and greenish hornblende often in bands: it is therefore a syenite. Another manufactured object is of a kind of trap rock found near Edinburgh, which may here be referred to as useful for various purposes, and extremely durable, if not very ornamental. The stone alluded to is not unlike that worked by Messrs. POILLEU (France, 962), and is called "Barnton Mount Granite." It is exhibited by Mr. G. JOHNSTONE, of Craigleith. The curling-stones, made of greenstone trap, and sent by Mr. A. CASSELS (Class I. 26), and Mr. J. KAY (Class I. 27), are also interesting from the great toughness of the rock of which they are made—a quality greatly required for the use to which they are put in the national game from which the name of *curling-stone* is derived. The material is felspathic, with small grains of quartz and minute particles of hornblende. Lastly, we may mention the ornamental works in Scotch granite, chiefly of jewellery, exhibited by Mr. JAMIESON, (Class I. 25) and Messrs. ELLIS and SON (Class XXIII. 12), and remarkable for the delicacy and beauty with which they are finished. These will doubtless be noticed elsewhere, so far as they claim admiration for taste and execution. We

* Institute of British Architects, Report of Meeting of 24th March 1851.

only refer to them here as showing good samples of manufacture of the fine-grained granitic rocks found in some parts of Scotland.

c. Works in Caen Stone.

The stone obtained from the quarries of Allemagne and others, near Caen, in Normandy, has been used in ecclesiastical architecture for so many centuries, that it would be useless to trace back its history for the purposes of this Report. The rock is an oolite belonging to about the same geological period as our own oolites worked near Bath; but the colour is better and more uniform, the texture far closer, and the material superior in almost every respect. It is at first absorbent, but improves on exposure. It cuts with perfect facility, and is thus admirably adapted for ornamental work in architecture, especially when sheltered from the weather. It may be had in blocks of any reasonable size and proportions, and is the finest and most valuable stone of its kind obtained from the secondary rocks. For certain kinds of exposure it is inferior to some of the English oolitic stones, but none excels it for internal work.

So readily worked and beautiful a material has naturally been selected by several persons to execute objects in sculptured stone worthy of the Great Exhibition; but it is, perhaps, somewhat remarkable that none of these come from France, where the material is so abundant. Of the exhibitors in this stone, the Jury have selected three as worthy of the Prize Medal, and one they mention honourably. We may proceed to describe these more minutely.

Mr. MYERS (Class XXVI. 533) exhibits a number of objects sculptured in Caen stone, most of which are placed in what is called the Mediæval Court. These are imitative of English mediæval architectural decoration, and are chiefly, though not entirely, ecclesiastical in their uses. The execution of the stone work is in all of them extremely good; the different objects are perfectly correct in execution, and the distribution of the details is effectually and well combined with unity of design, showing clearly the artist's knowledge of his subject and of art. A Prize Medal has been awarded to this exhibitor.

The canopied niche, containing a figure of St. Peter, designed and executed by Messrs. LANE and LEWIS, of Bristol (53), is good both in style and execution, and so creditable in every respect that the Jury felt no difficulty in awarding a Prize Medal to these exhibitors. The stone is of fine quality, and the treatment well adapted to the material. The statue of St. Peter especially is delicately and skilfully worked, and the smaller figures of our Saviour and the Evangelists are well executed. At the same time it should be observed, that the drapery and pose of the figures are not strictly Gothic, although in good keeping with the architecture, which is distinctly defined and well finished, especially in the ornamental parts. The work is not cut out of a single block, which could have been done, although with difficulty, and in this respect it cannot rank so highly as a work in one piece of stone would do.

The font by Messrs. MARGETTS and EYLES (91), also rewarded with a Prize Medal, is a very fine specimen of sculptured stone, although there is a want of freedom and finish observable in some parts. The general style and execution is, however, excellent, and some of the details of the figures are very beautiful.

A sepulchral monument of the decorative period, by Mr R. BROWN (52), has

been considered worthy of Honourable Mention. It is well conceived and well executed, and is creditable both in design and workmanship.

A cross of large size, sculptured in Caen stone by the Hon. Mrs. Ross, and exhibited in the West Nave, No. 79, is worthy of notice as being the work not only of an amateur, but of a lady.

In addition to these objects, there is a chimney-piece, by Mr. Frewer, of Ipswich (5), showing much skill, and having a number of minute but imperfectly finished details. The design is allegorical, but not carried out completely. A singular monument of new form (that of a three-sided prism) has been sent by Mr. Baker, of Southampton (54); and some small but creditable models, by Mr. Laurie, complete the list of sculptured works in Caen stone. The quality of the stone is shown in some specimens in Class I. (No. 176), exhibited by Messrs. Luard, Beedham, and Co., importers; and these are of considerable interest and value, as, in addition to recently cut surfaces, they include fragments which have been exposed for several centuries to the weather both in England and France.

d. Works in Bath Stone.

The works in Bath oolite are neither numerous nor important. The material itself, although much used, is not capable of resisting the action of an English, and especially a London atmosphere; so that few artists have thought it worth while to exert their talents on a stone of so little durability. The substance is sometimes of good colour, works freely, and is obtained in considerable blocks; but it falls far short of Caen stone in every respect. A vase and pedestal, elaborately carved and exhibited by Mr. Vaughan (20), show the extent to which the chisel may be used in it; and a bust of Milton, by Mr. Newman (60), is a good sample of the whiter kinds, not ill adapted for internal architectural decoration. Mr. Plows (34) has sent a number of small articles manufactured of the same substance.

e. Sundry Works in Freestone.

Purbeck stone and Purbeck marble, materials susceptible of polish and formerly much used in ecclesiastical architecture, are exhibited in a sculptured form by only one person, Mr. Webber (Class XXX. 149), who has sent a design for a tomb made of this stone placed on a slab of the marble. The material is well adapted to church purposes when new, and retaining its polish; but that being soon lost, the surface becomes discoloured, and loses nearly all its former beauty. It is not much used at present, except for restorations.

The magnesian limestone, till lately seldom used in the vicinity of London, is a stone of great beauty and value, and remarkable for its durability, at least in those parts of the country in which it is found. The best quarries appear to be those near Bolsover, in Derbyshire; and the stone has been selected from that neighbourhood for the construction of the external work of the Houses of Parliament. A specimen showing its qualities has been forwarded by the contractor, Mr. Grissell, and is exhibited in Class I. (185). Honourable Mention is made of this work, as good of its kind, and well illustrating the use of the stone.

A specimen of freestone is exhibited by Mr. T. King, of Morpeth (Class I. 136),

to show the quality of this material from Hartford Bridge, Northumberland, and the nature of the work of which it is capable. This has also been considered worthy of Honourable Mention, as a well-executed illustration of the use of a valuable material.

A very interesting exemplification of the quality and decorative use of Craigleith stone is exhibited by the proprietor, Mr. JAMES GOWANS, of Edinburgh (Class I. 132). The stone is much used for building purposes in Edinburgh, and the Redhall Quarry, from which the larger blocks were taken, is of excellent quality. It belongs to the carboniferous system, and is generally of lightish-grey colour, fine grained, and almost wholly composed of pure silex. It is rather costly at first, but very durable, and may be worked perfectly for every architectural purpose. It contains a small percentage of bitumen.

The objects exhibited are two: one is a group of two children (the Orphans), on a plinth of Binny stone, which is remarkable for the large quantity of bitumen it contains;* the other is a heroic statue of Sir William Wallace. Both are works of merit, and are especially valuable as demonstrating the capability of a stone hitherto not used in England for the execution of such works; and the Jury have awarded a Prize Medal as a mark of their appreciation of the exhibitor's efforts to introduce a material nearly indestructible, and for so admirably illustrating its use.

In Class XXVII there is a chimney-piece constructed of a stone obtained from Cornwall, and known as the polyphant freestone. The material is hard, and is said to admit of a good polish, although this and another specimen exhibited are both varnished. The style of the chimney-piece is peculiar. The exhibitor is Mr. BRENDON (3).

A Prize Medal has been adjudged to M. DESAUGES (France, 1184), for two objects constructed in Tonnerre stone, of which there appear to be distinct varieties, and of which the specimens sent are of fair appearance and good quality (obtained near the town of Tonnerre, Department of the Yonne, Central France). One of these objects is a pavement and the other a chimney-piece, the latter showing much labour of execution, and a complicated but poor design. In the architrave there is inserted a small tablet, in cement, representing the zodiac. At the top of the architrave, and at the corners, are groups of animals laboriously carved. At one side is a tall figure in relief. The whole is somewhat in the style of the sixteenth century. The stone in this composition is hard, and the colour not unpleasing, and it seems well adapted for some purposes of internal decoration.

Mr. JOOSTENS, of Belgium (457), has exhibited a pinnacle made of Ordain stone, which the Jury consider worthy of Honourable Mention, as well for the nature of the material, which is hard, even-grained, and well selected, as for the execution, which is neat and well finished: the design is good and pure.

Several artists have sent vases and other objects sculptured in the soft stone of Malta, a material offering great facilities for working, but not remarkable for beauty of appearance, having a peculiar dead-white colour resembling plaster of

* This bitumen is obtained in quantities so considerable that it has been used in the manufacture of candles, of which specimens are exhibited in Class I.

Paris. The delicacy of workmanship in these sculptures is very surprising, and, in some cases, also, there is much ingenuity shown, and much talent in designing. The Jury have awarded Prize Medals to Mr. DECESARE (27), and Mr. F. TESTA (33); and consider that the works of Messrs. DIMECH (28), S. TESTA (30), and SOLER (29), are worthy of Honourable Mention. There are also some similar objects sent by Mr. FOSTER, an English exhibitor (Class XXX. 303). The stone, of which these vases, &c., are carved, is a yellowish-white calcareous freestone, from forty to fifty feet thick, belonging to the tertiary period, and immediately overlying a semi-crystalline limestone, forming the base of the deposits in Malta and the neighbouring island. Very large quantities of the softer freestone are used in the island for building and other purposes, and are exported to all parts of the Mediterranean.

From Tuscany (97) a few articles are sent, sculptured in a kind of lithographic stone, found near Florence, and exhibited by Mr. S. GIOVANNINI, the proprietor of the quarry. The material is fine-grained.

Several models of temples and other edifices are sent from India, constructed of a peculiarly tough but not very hard stone, of which there appear to be different varieties. A few of these are extremely well carved, and show great neatness and finish in execution. Some of them have been coloured artificially. There are also two small latticed windows of delicate open stone-work, showing remarkable skill in cutting stone, besides extreme elegance of design. The material is of pleasing colour and appearance, and is in these respects superior to the Gya stone, which is of grey colour, and of which there are several manufactured objects, chiefly small idols.

In concluding this account of the articles in sculptured stone, the Jury make Honourable Mention of a somewhat remarkable pair of vases, cut with a penknife out of sandstone from the neighbourhood of Jerusalem, and the work of an Israelite living in that city. These vases, executed by Mr. SCHNITZER, and exhibited by Sir MOSES B. MONTEFIORE (Class XXX. 161), show much ingenuity and patient labour. The material is worthy of notice, as a rare instance of stone of the kind being capable of such treatment.

C. MANUFACTURES IN SLATE.

The collection of split, sawn, and other manufactured slates exhibited by Mr. THOMAS STIRLING, jun., of the Belvidere Road, Lambeth (Class I. 209), exhibits such care in collection and arrangement, and so much novelty of application, excellence of material, variety, and usefulness, as to claim a Prize Medal. Almost all the really important uses to which slate is applied may here be seen; and many new arrangements are shown, some of which at least will be generally adopted. Mr. Stirling exhibits a construction, consisting of an open cabinet of five sides, made entirely of large slate slabs from different quarries and districts, and illustrating the use of slate in the construction of strong-rooms, powder-magazines, &c. On the top of this cabinet is a cistern, composed of slabs of slate, secured in panels by a method discovered by the exhibitor, and admitting of almost indefinite extension. The exhibitor has selected roofing-slates and slabs of the best quality, from the principal quarries in the United Kingdom, as illustrations of the material

and of the qualities of slate prepared for the London market. These either compose the cabinet, or are exhibited within or near it.*

Besides the application of slates and slate-slabs in the ordinary way, and as already mentioned, Mr. Stirling exhibits illustrations or specimens, showing its use for steps, balconies, larders, wine-cellars, dairies, skirtings, linings for damp walls, wine-coolers, bread, pickling and pig-feeding troughs, urinals, head and foot stones for graves, tombs and monuments, clocks and sun-dials, sinks (cut out of a solid block), floors of conservatories, warehouse-floors, railway-station paving, stables, and many other purposes.

To these various miscellaneous articles, there is added a set of models of roofs, covered with different descriptions of roofing-slate, in ten different colours. One of these roofs is covered with slab-slates, with a solid slate roll to cover the joint, as arranged and proposed by the exhibitor. The slate recommended for such purposes is that from Cornwall, as it costs less for repairs than the Welsh, and the colour more nearly resembles that of lead.

In addition to these interesting and useful specimens of manufactured slate, there are exhibited several objects in enamelled and varnished slate, now coming into use for various decorative purposes, which will be noticed elsewhere. Some specimens of filters are shown, and many applications of slate, to which it is not necessary here to allude. To these is added a model of a new machine for splitting and cutting slate, evincing considerable ingenuity.

To BEWICKE BLACKBURN, Esq. (21), of the island of Valentia, County Kerry, Ireland, the Jury have also awarded a Prize Medal, for his manufactures in Valentia slate, and for the excellence of the material exhibited. The slate from the south-west of Ireland, and especially from the Island of Valentia, is not so capable of being split into fine roofing material, as that of Killaloe, County Clare; but its remarkable strength, and the evenness of its texture, render it extremely useful for various purposes, both in building and for flags.

Slabs of Valentia slate are easily obtainable 30 feet long, four or five feet wide, and from six to twelve inches thick; and the quality, as seen by the specimens sent by the exhibitor, is in every respect excellent. The slabs, sash-bars, and roof-ridges, are all good examples of the quality of the material, and the garden-seat and table are excellent, both in themselves, and for the uses for which they are intended. The quarries of Valentia have employed as many as 200 persons at a time.

The OLD DELABOLE SLATE COMPANY (Outside, 8) have exhibited, besides some unmanufactured slates, a very large and well-constructed cistern of Delabole slate, capable of containing 2,000 gallons, and provided with a filter. The Jury consider that this deserves Honourable Mention, as a fit and useful application of a material of good quality at a moderate cost.

Several exhibitors have sent slate cisterns, furnished with filters, the mechanical arrangements of which belong to another Class. As far as relates to the material,

* The slates are from the following localities:—Penryn quarries, near Bangor; Llanberis quarries; quarries of the Dorothea Slate Company, near Caernarvon; various quarries at Feestiniog and Machynlleth, all these being in North Wales; and from the Delabole quarries in Cornwall, and various quarries at Coniston, in Lancashire; and Langdale, in Westmoreland.

and its application, the Jury consider that slate is admirably adapted for such purposes. The exhibitors of such filters are, besides those already mentioned, Mr. T. STIRLING, sen. (120), Mr. STRUTHERS (Outside, 16), and Mr. C. HUNT (109).

A peculiar application of slate in the manufacture of coffins for vaults is illustrated by a model exhibited by Mr. J. EKINS (13). The material is, perhaps, better adapted for such purposes than lead, and the cost may be less; but such means of preserving the human body in a state of partial decomposition are of questionable value.

An inkstand, of very beautiful Penrhyn slate (Class XXVII. 63), manufactured by I. ROWLANDS, of Llandegai, near Bangor, is an ingenious and very carefully worked illustration of what can be done with this material. The Jury make Honourable Mention of it, as an encouragement to this kind of industry, and the endeavour to make a useful and ornamental object of the only material which the exhibitor had before him.

The school slates of Messrs. DAWBARN and Co. (Class I. 208) are of large size and good quality; and the same may be said of the slate ridges and rolls exhibited by Mr. D. WILLIAMS (Class I. 215). The application in both cases is correct, and the manufacture important.

The model exhibited by Mr. J. GEORGE (Class I. 213) is intended to show the applicability of slate in conjunction with iron to constructive purposes.

Three Companies exhibit collections of French slates, all of which include split and dressed slates and slabs. The Jury consider the slabs from Angers, exhibited by the agent of the Angers Slate Works, M. LARIVIERE (290), as worthy of Honourable Mention. The others are from the Joint-Stock Company of the Slate Works of Rimogne (Ardennes), A. MOREAUX, agent (378); and the SLATE WORKS COMPANY of Rimogne and St. Louis (694). The slates, especially those from Angers, are of large size and fine quality, and are well dressed and manufactured. Messrs. FORTON, DUPONCEAU, and Co. (France, 1228), of Chattemoue (Mayenne), exhibit a slate billiard-table, considered worthy of Honourable Mention. In the manufacture of billiard-tables slate is now rapidly superseding all other material.

Some slates of good quality are exhibited by Mr. S. SOLESI, of Chiavari, Sardinia (2). These include not only roofing-slates, but a table and polished writing-slate. They are fairly worked.

D. MANUFACTURES IN VARIOUS KINDS OF STONE AND OTHER MINERALS.

Under this head are several miscellaneous articles, such as steatite, or soap-stone, coal and jet, tufa, &c., not very easily included under other headings. Though unimportant, they possess some interest. The steatite especially, although at present little used in this country, is well worthy of attention, as possessing valuable properties, and capable of being supplied from America and elsewhere in blocks of large size. The articles manufactured of coal are more curious than useful; but those of jet are not without value in a commercial sense.

The MARYLAND SOAP-STONE COMPANY (United States, 180) has received Honourable Mention for articles manufactured in the steatite abundantly found

near Baltimore, and exhibited by the Company. This stone, hitherto little used for economic purposes, may be obtained, without flaw, in large blocks, adapted for many useful purposes, those especially instanced by the exhibitors being baths and sizing-rollers used in cotton mills. For the latter purpose it possesses the great advantage of not being affected by the acids ordinarily used in sizing, and of not warping, contracting, or expanding by changes of temperature and moisture. It is also recommended as an admirable material for fire-stone, kitchen-sinks, wash-tubs, bath-tubs, urinals, &c. It is readily wrought, being bored, turned, and planed by the ordinary tools of the carpenter, and it may be screwed together with nearly the facility of hard wood.

The wholesale prices of blocks of steatite, delivered on board at Baltimore are as follows:—

Sawn or chiselled blocks, per cubo foot,	1 dollar (4s. 3d.)
Slabs, per square foot super. 1 inch thick,	25 cents (1s. 1d.)
Ditto ditto 1½ "	28 " and more in proportion to thickness.

The manufactured articles would be supplied at corresponding prices, but it is considered that if the blocks cannot be admitted duty free, as raw material, it would be necessary to charge double the price quoted for selected blocks tested for special purposes.

This steatite is a silicate of magnesia, and the form of it here exhibited is compact, of greyish colour, soft to the touch, of specific gravity 2·65 to 2·8, hardly affected by sulphuric or muriatic acids, and little altered by exposure to intense heat. Other objects of steatite are exhibited from India, where the material appears to be abundant, and where it has long been used for household utensils.

A couple of vases manufactured of the tuffa, obtained from the hot-water springs of Carlsbad, are considered by the Jury worthy of mention, for the nature of the material. The vases themselves offer nothing remarkable. They are exhibited by Mr. GOTTL (Austria, No. 724).

Several persons have exhibited articles manufactured of cannel coal and jet, materials derived originally from the vegetable kingdom, but now existing in a mineral condition. These, although not sufficiently important to require any lengthened description, are interesting, especially the small objects in jet, from their manufacture giving employment to many persons in various parts of Europe.

Cannel coal is chiefly used in the manufacture of gas, but some of the harder and more compact bands are occasionally cut into various ornamental objects, several of which are represented in the Exhibition. The most interesting of these as a finished work, well designed and well executed, is a garden-seat, exhibited by His Royal Highness PRINCE ALBERT (140), manufactured by Mr. T. W. WAUN, from the design of L. GRUNER, Esq. This is made from a fine kind of cannel, called 'Parrot-coal,' obtained in the Fifeshire coal-field, on the estate of Admiral Wenmuss. The Jury consider that both for design and execution this object is worthy of Honourable Mention.

A well-constructed model of the Durham monument (Class I. 269), and a

wine-cooler (90), both made of cannel coal, are exhibited by Mr. G. H. RAMSAY. This coal is obtained from a part of the Newcastle coal-field, and is a kind largely used for gas-making in London. Being compact and brilliant, and not soiling the fingers, it is well adapted for working into ornaments.

A number of small articles are exhibited by the INCE HALL COAL COMPANY (Class I. 268), manufactured of their cannel, which is little inferior to that of Newcastle, and is obtained from a part of the Wigan (Lancashire) coal-field. A collection of yet smaller objects is shown by Mr. MITCHELL (Class I. 270), illustrating the uses to which a hard variety of the same substance from the vicinity of Edinburgh may be applied.* A set of chess-men, manufactured of coal and alabaster, is exhibited by Mr. C. VOKENS (30), as another illustration of a similar kind, and a snuff-box in coal is described amongst the goods from China.

Jet is a material chiefly used for ornamental purposes. It is hard, brittle, opaque, scarcely heavier than water, and takes a very high and beautiful polish. It is found in various parts of Europe, America, and Asia Minor. In Roman Catholic countries, a large quantity of small ornaments (as crosses, beads, rosaries, &c.) is made of this material, and it is extensively used with us for mourning decorations.

The principal exhibitors of jet are Messrs. SLATER and WRIGHT, of Whitby (Classes I. 2, and VIII. 312), where the raw material is obtained in abundance and in very good condition. Their articles belong to the class of jewellery. Another exhibitor of English jet is Mr. GREENBURY (Class XXIII. 8). The jet of the Asturias, which has long been known in Spain, is represented by some specimens forwarded by the town authorities of Oviedo (Spain, 33). These articles are sold at an extremely low price on the spot.

The Jury might here refer to amber, as being a mineral production; but the articles exhibited partake so closely of the nature of jewellery, that it is considered better to omit noticing the substance and its exhibitors in this Class.

Group 2.—POLISHED AND INLAID WORK IN STONE, &c.

Under this head are included all kinds of earthy mineral substances, as stone, marble, alabaster, granite, porphyry, jasper, quartz, jade, agate, and gems, used in a polished state either in constructing or inlaying various objects of decoration and use. The working, polishing, and inlaying of several of these are generally in the same hands; but in describing the objects, we propose to treat of the inlaid work as a separate subject. The cutting of jasper, quartz, jade, &c., is a peculiar manufacture, when performed on a large scale.

The total number of exhibitors in this group is about 120, of which those from the United Kingdom amount to something less than one-half. Tuscany and France take the next place in point of number and variety, but the most attractive objects are from the former country, consisting of mosaics or inlaid work, those from the latter being principally chimney-pieces. Austria has four exhibitors, three of them Italian, and the objects exhibited are chimney-pieces, strictly Italian in character. Rome has three exhibitors, one of them extremely

* From an analysis forwarded to the Reporter by the exhibitor of these articles, it appears that this variety of cannel yields as much as 15,000 cubic feet of gas per ton.

remarkable for the beauty of the workmanship shown. Italy is thus strongly represented, a fact which might have been anticipated from the habits and history of the people. Russia has long been celebrated for work in mineral manufactures, and the exhibitors from that country have not failed to take this opportunity of showing the progress that has been made of late years in the processes of polishing and inlaying, especially with regard to Florentine mosaic and veneering in malachite. From Germany there are several exhibitors, but the progress there made in the art of decorative work in marble and mosaic does not appear to be well represented in the Exhibition, although there is one very creditable exception, showing that the polishing of granite is thoroughly understood in Berlin. Belgium exhibits a few, but very few, objects of interest. The countries of the Peninsula are contented with sending their marbles rather as specimens of material than workmanship. It remains only to speak of Sweden and Norway among European countries, but these are extremely remarkable, and present good proof of a thorough knowledge of the art of granite-working in its best applications.

From the south coast of the Mediterranean we have a few fine slabs exhibited from Egypt, though chiefly as raw material, and one inlaid table from Tunis, interesting for the marbles, and also illustrating a manufacture. India and China, especially the former, are much more remarkable, and show a degree of skill and taste in the most difficult and important decorative work in stone and *pietre dure* that puts to shame all that is done in Europe, and shows how much yet remains to be learnt from a country which has so long been the seat of a certain kind of civilization.

America presents a few objects, which will be found noticed in the proper place.

E. MANUFACTURES IN MARBLE AND ALABASTER.

Manufactures of this kind partake of that higher art which is recognised as sculpture, but there is so much of a purely mechanical nature, and so much more in which a certain degree of taste in execution redeems the character of questionable models, that in every country there has been from time to time a characteristic style, and a distinct manufacture in marble, the history of which would be valuable and interesting.

Italy is pre-eminently the country where this manufacture has been found most congenial to the artistic feeling of the mass of the people, and there, or in its vicinity, at the present day, a large part of the best marbles used in central Europe are obtained and worked. Of late years, however, France, Spain, Portugal, and parts of Germany and Belgium, have employed for their own use, and in their own style, many useful and valuable marbles with which they abound; and in England manufactures have arisen, at first and chiefly in Derbyshire, but also in Devonshire and Cornwall, in which much has been done to raise the character of marble decoration, by employing the excellent material which abounds in those places, and by introducing various useful objects of house decoration at a price which, though somewhat too high for the mass of consumers, is far below that of foreign goods of the same kind in this country. Ireland also, in which several fine marbles occur, has given proof of some activity in this manufacture, for which, indeed, nature has offered many facilities.

There are some marbles from Greece, and also from Italy and the coast of Asia Minor, which were greatly admired and used by the ancients, but of which the quarries are now exhausted or concealed by rubbish. Amongst them are the true Parian of Greek sculptors, and some other fine white marbles; the *nero antico*, now a very rare black marble, considered purer and better than the known kinds; the *rosso antico*, a deep blood-red marble, with veins and spots; the *verde antico*, a green and very beautiful porphyritic breccia; the *giallo antico*, not unlike the modern Sienna marble, of very rich yellow tint; with some others. Most of these are only known in sculptured specimens, but many, if not all the colours, are closely approximated by recent marbles.

Marble is cut with a thin plate of soft iron used as a saw, and supplied continually with water and sharp sand. Both the hand and machine power are used, and the cutting is carried on continuously in most marble-works. The polishing is commenced by rubbing down the surface with sharp sand till it is perfectly flat. Finer sand is then gradually used, and at length emery, after which tripoli, the last polish being given with tin-putty. The coarse sand is usually rubbed on the marble with a plate of iron. The polishing rubbers are coarse linen cloth. Water is required in every stage.*

The chief marble manufacture of England is in a part of Derbyshire, remarkable for its picturesque beauty, extending along the valley of the Derwent and its principal tributary the Wye, from below Buxton to Derby. The machinery for sawing and polishing was first established in Derbyshire, at the

* The Reporter is indebted to Messrs. Hall, of Derby, for the following account of the mode of turning and polishing marble, spar, and alabaster, as practised by them:—

Having chosen a piece of marble about the size required, and free from veins, rents, &c., to which black marble is very subject, the first process is to level one face, and with a pair of compasses strike a circle round the outer edge, then with a mallet and pointed chisel, work it roughly to a circular form. It is then ready for the lathe, and being fastened with a resinous cement to an iron chuck, it is screwed to the lathe-spindle, and a very slow motion given to it. The only tool used is a bar of fine steel about 30 inches long by $\frac{1}{4}$ in. square, drawn to a point, and well tempered. This is forcibly applied to the marble, which it reduces to the proper form by slowly scraping off small pieces. After the correct outline is acquired with this tool, it is ready for the grinding process, the first being to apply a piece of coarse and hard sandstone with water (the lathe now having a rapid motion) until all the tool-marks are ground out. A finer piece of sandstone is then used to remove the coarse scratches of the previous one, and so on with a few other and still finer stones, until all the scratches are quite obliterated. This prepares it for polishing. A piece of cotton cloth, washed quite clean, and well rubbed with flour emery, is applied to the marble, and polishes it to a certain extent. A similar piece of cloth is then rubbed over with putty powder (white oxide of tin), which gives a very high polish.

This is the method, with a few trifling variations, by which all kinds of marble are turned and polished.

Fluor spar undergoes nearly the same process, but requires much greater care and skill on the part of the workman, as the spar, being composed of a mass of crystals, whose cleavage is in various directions, requires a more delicate manipulation than almost any other stone.

Alabaster is a soft stone, and can be sawn with a common tooth-saw, and is turned and polished in a very similar manner to marble.

The columns formed of pieces of black marble and alabaster (exhibited in Class I., No. 146, by J. and G. Hall), show the various processes, beginning with the rough stone at the bottom, and ending with the final polish at the top.

village of Ashford, near Bakewell, in the year 1748, water being the motive power. About the year 1810, similar machinery was erected at Bakewell. Both these works are situated near the quarries. Within a few years other works have been established at Buckland Hollow, near the line of the Midland Railway. These works give employment to upwards of seventy persons: about one-fifth work in the quarries: the rest are marble masons, polishers, &c., employed in part upon foreign marbles. Besides these three works, others have been established in Derby for many years.

The most important marbles of Derbyshire are the black, the rosewood, the encrinital, the russet, or bird-eye, and a mottled dark and light gray kind, occasionally containing numerous small corals. Of some of these there are several varieties. Others might be added to the list of those found in the northern part of the country, one of which is a beautiful red, resembling the *rosso antico*, but it is obtained only in small blocks or lumps.

At Wetton, in Staffordshire, near the borders of Derbyshire, are marbles differing much from the above, but they have not been brought into any considerable use, and are generally subject to flaws.

The *black marble* is of very fine colour and texture, but large slabs free from small veins of calcareous spar are rare. The best quality occurs in beds of from 3 to 8 inches in thickness; some beds are thicker. This marble is, perhaps, superior to the similar kinds found in other parts of Europe, and is greatly valued for inlaying. It is tough, and contains a good deal of carbon, which imparts the colour. Within a very recent period the finer slabs have been inquired for, for exportation to Florence, Malta, and St. Petersburg, besides being used in Devonshire and Derbyshire.

Black marble is extensively used for ornamental objects, such as vases, pedestals, chimney-pieces, &c., for which it is admirably adapted. It is occasionally ornamented in various ways, as by etching, engraving, and inlaying. In the two former processes the polished surface is removed, and the brown colour of the rough marble exposed. Powdered white-lead is sometimes rubbed into the etched surface to increase the effect. By a peculiar process used at Derby, the brown colour is sometimes exposed without the polish of the marble being destroyed. The ornament produced by this process is more durable than the ordinary etching.

The *rosewood marble* is extremely hard, and of close texture. The beds are of considerable thickness; but the most beautiful part of the marble is only about 6 inches thick. The name is derived from the marking of the marble being somewhat similar to that of rosewood.

The *encrinital marble* is the one in most extensive use, and contains very numerous fossils, consisting almost exclusively of the broken fragments of encrinital stems often entangled in coral. It may be obtained in blocks of large superficies, and of a thickness of 2 to 2½ feet.

The *russet*, or *bird-eye*, takes its name from its colour and appearance, the shades varying from light gray to brown. It contains numerous minute fossils, also encrinital, and is found in beds of from 6 to 18 inches in thickness.

The dark and light mottled gray marble (called Newburgh marble), and the overlying bed, which is coralline, can be obtained from 1 to 2 feet thick.

The manufacture of Devonshire marble is much more modern, and the material

is generally less manageable. Almost all the beautiful marbles of this county, especially those near Plymouth, are fossiliferous, brittle, and very apt to contain veins and cracks. They are illustrated by some beautiful and interesting specimens, which will be alluded to as the works of individual exhibitors. The marbles of Devonshire belong to an older geological period than those of Derbyshire, the latter being exclusively of the carboniferous limestone series, underlying the coal measures and the millstone grit, while the former are of the Devonian, or middle Palæozoic epoch.

The other kinds of marble, obtained from various localities, do not appear to involve any peculiar method of manufacture, nor is it necessary to give further details on this subject. It may well be supposed that the cutting and polishing of alabaster, a material much softer than marble, is in a corresponding degree easier. It is said that soap is used in polishing alabaster, and some of the objects constructed of this material are rendered translucent by being soaked in some kind of oil. The chief locality of this manufacture has long been in the north of Italy, near Leghorn, where the material is very abundant. A considerable number of alabaster ornaments are now made in Derbyshire, chiefly from Italian models: those originated on the spot are not yet remarkable for excellence of design. The material is obtained in that county in considerable quantities.

In proceeding to mention the different exhibitors in these materials, we may begin with an account of the series of manufactured marbles sent from various places.

a. General Collections of Marbles.

There are several collections of marbles exhibited from foreign countries, in which the specimens are at least partly manufactured, and some even finished, although the general intention in such cases seems to have been to exhibit them rather as raw materials than as specimens of manufacture. Many of them thus belong to Class I. (Raw Materials of the Mineral Kingdom); but others partake so distinctly of the character of the objects in Class XXVII., and so clearly involve processes of manufacture, that the Jury of this latter Class have thought it necessary to allude, however briefly, to them. To some of these they have voted Medals.

The collection of Italian marbles forwarded by the ROYAL TECHNOLOGICAL INSTITUTE OF TUSCANY (Tuscany, Nos. 1 and 98) is of very considerable interest, and includes many varieties little known in this country, some of them remarkable for their beauty and excellence. The Jury mark their sense of the value of this series by awarding a Prize Medal to the Institution by which it has been sent.

To M. DÉJEANT (Portugal 232 to 247, 250, 251, 259 to 274) a Prize Medal has been awarded, for a most interesting series of Portuguese marbles, of great variety, and including many of considerable beauty. A fine collection of Pyrenean marbles is sent by Messrs. DERVILLE and Co. (France, 162), to whom also a Prize Medal is awarded; (Prize Medal given by Class I. also) and an almost equally interesting series of specimens from Languedoc, is contributed by M. CAFFORT (France, 444), of whom Honourable Mention is made. M. COLIN (France, 1564), who has exhibited a series of polished marbles, granites, and serpentine from the Vosges mountains is also Honourably Mentioned.

THE GREEK GOVERNMENT (Greece, 26 to 49) has sent samples from some of those quarries whose reputation dates as far back as history can record, but they are not in a condition of manufacture to justify extended notice here. The marbles are decidedly inferior in quality to some of those obtained more recently in greater abundance from nearer localities, but if the quarries were properly and extensively worked far better material might probably be obtained.

THE EGYPTIAN GOVERNMENT (Egypt 1-4) has been induced to open, of late years, the rich stores of oriental alabaster, a material celebrated in antiquity, and of which is made one of the most interesting works in mineral manufactures in the Great Exhibition.* The condition of this marble is very peculiar, but it would seem that considerable quantities of excellent quality might readily be obtained. It is a peculiar condition of limestone (a true carbonate of lime), apparently formed in the manner of stalagmite, and on account of its peculiar tint and translucency was called by the ancients alabaster.

From India are sent many specimens partly manufactured, indicating the existence, in that country, of valuable material more or less resembling our marbles, and suitable for similar purposes. A few of these are coloured, and the quality of the white marble is very peculiar. One of the coloured kind may be mentioned as affording a tint of pale green, unknown in Europe. This is from Bellary (Madras), and is a magnesian rock, probably a variety of serpentine. Many of the harder materials might also be mentioned.

A small series of partly manufactured jades recently forwarded from China, by DR BOWRING, is interesting on account of the material, which is, however, too difficult and costly in working to be much used for economic purposes, unless, indeed, mortars and pestles and some other objects for chemists could be manufactured of it of larger size than can now be made of agate, and at moderate cost.

Many collections of marbles, and other substances referred to this Class are not noticed here, because they are less decidedly manufactured. Taken as a whole, it cannot be said that these collections are in any sense complete; but they may, if afterwards brought together, form a nucleus of much value, which will suggest many useful hints. We proceed now to describe in succession the various manufactured objects which are most easily and readily compared.

b. Chimney-pieces.

The chimney-pieces sent for exhibition involve so many differences in style and material, and are of so many degrees of merit, that it were unreasonable to judge them all by one standard, or regard them from one point of view. Architectural decoration and sculpture, beauty and excellence of material, adaptability to the special purpose required, cheapness, and many other considerations, must all be taken into account; and the Jury have endeavoured to select for reward from the whole number those most remarkable for each of these qualities.

The works of this kind of the greatest pretension and highest claim to originality are three chimney-pieces of statuary marble (of Carrara), exhibited by GIUSEPPE BOTTINELLI, of Milan (Austria, 726). They are all characterized by elaborate design, and excellence in the details of execution. They also show

* The object alluded to is the Tazza, by Mr. Dallamoda (Rome, 19).

much freedom and boldness of sculpture, and deserve much praise for the vigour and life with which the numerous figures and various objects are represented. The Jury fully appreciate this high excellence in many points, and adjudge a Prize Medal to the exhibitor ; but they would direct attention to the fact that the style of ornament is not adapted to the object, nor are the designs altogether in good taste. On the whole, however, their artistic merit is of a high order, the figures are correctly modelled, and full of life and delicacy, and this effect is produced by the chisel, and is by no means the result of mechanical assistance. The faults of style seem to have arisen from an attempt at great originality, which is but partially successful. It should be remarked, also, that the material is not of the finest quality.

The chimney-piece, by G. MOTELLI (Austria, 728), also of Milan, is marked by the same excellences, and some of the same faults as those of Bottinelli. The design is generally good ; but the countenances, especially of the Cupids, are unpleasant, and a part of the marble is left rough to heighten the effect, which is hardly admissible in a chimney-piece. In other respects the execution is highly creditable to the artist. This, and a marble mantel-piece by G. BENZONI (Austria, 725), are considered by the Jury as worthy of Honourable Mention, both of them bearing evidence throughout of the taste, judgment, and feeling of an accomplished artist.

Next to the works of these Milanese sculptors, the Jury place the chimney-piece exhibited by A. LECLERCQ, of Brussels (Belgium, 425), which is constructed of very beautiful Carrara marble. The architectural design is of considerable merit, and the details very admirably executed. The general work of the figures and principal features of the design are also commendable ; but the purely ornamental part is inferior in composition, sometimes confused, and has little life and delicacy of expression. It is also finished too much with the file and pumice-stone. Notwithstanding these faults, the work, as a whole, has very great merit, and has been recommended as worthy of a Prize Medal.

A very beautiful and carefully worked specimen of the black marble of Belgium, executed in that country and fitted to an English stove, is exhibited in Class XXII., No. 491, by I. NOIRSAIN. It consists of a chimney-piece and large mirror frame above, without ornament, but of noble proportions. The effect is rather heavy, but the work is so good that the Jury award a Prize Medal to this exhibitor. The material is also excellent.

There are no less than five exhibitors of marble chimney-pieces from France, one of whom exhibits several works of good general character, and in good taste ; and another, a group chiefly remarkable for combining a certain degree of excellence with moderate cost. The rest all offer some points of interest, but they are confined to the simpler kinds for house decoration.

The Jury award a Prize Medal, to Mr. SÉGUIN (France, 692), for a carefully finished work in veined Carrara marble, of very ingenious design, and some merit in workmanship. They also give a Prize Medal to Mr. J. A. LEBRUN, jun (France, 572), for three similar objects in white and veined marble, which are stated to be of moderate price, and are well adapted, by their style and comparative simplicity, for the usual purposes of chimney-pieces. The cost of a moderately ornamented chimney-piece by this maker is said not to exceed 12*l.* in Paris.

Three chimney-pieces by Mr. MARGA, of Paris (France, 608), deserve notice, and one of them, of veined Carrara marble, is in good taste and well executed. Of this exhibitor the Jury make Honourable Mention. Mr. J. DUPUIS, also of Paris (France, 184), sends three similar objects, one of which, with a simple geometrical pattern, is in good taste, without any high pretensions. Generally speaking, the French works of this kind exhibit a somewhat over use of the file, and too little of that free handling by the chisel which gives life and expression to a sculpture.

We come lastly to the English chimney-pieces, which are not very remarkable either for design or execution. Excluding those which do not owe their chief excellence to inlaid work, few are left that will detain us long. In the Nave, West (No. 82), there is one by Mr. THOMAS, of white marble, with a bust of Shakspeare and various figures, the sculpture of which is tolerable, but the whole is too much like a monument. In the same part (No. 86) is a rather elaborate white marble chimney-piece, by Messrs. BRINE BROTHERS and T. SHARP. The design is not remarkable, but the work is good. The gilt ornament is perhaps more novel than admirable, but the Jury have recommended the exhibitor for Honourable Mention.

In Class XXVII. 17, the LONDON MARBLE WORKING COMPANY exhibits a good white marble chimney-piece, for which, and several other objects in marble, a Prize Medal is awarded. Mr. TENNANT and Mr. HALL (37 and 38), exhibiting together several Derbyshire and other marbles, of which Honourable Mention is made, have, amongst the rest, a black marble chimney-piece, with stove, and porcelain tiles. Others will be afterwards described amongst the inlaid work.

There are several chimney-pieces in Class XXII., which rather illustrate improvements in stoves than offer anything new or remarkable in marble working. One of them, however, by Messrs. THOS. and JAMES NELSON (102), is well-executed and handsome, in a stone somewhat difficult to work, and the Jury consider it deserving of Honourable Mention. An alabaster chimney-piece is exhibited by Mr. W. PIERCE, but the material is manifestly unsuited for the purpose.

Lastly, there is a veined Carrara marble chimney-piece, by Messrs. PORZELT and HARPERATH, of Cologne (Prussia, 317), which is mentioned as being the only work of the kind from North Germany. It should be remembered that this kind of house decoration is little needed in countries where close and ornamental stoves take the place of our open fire-place.

On the whole the Jury cannot highly praise the group of objects now under consideration: those of greatest pretension lack simplicity, and the rest are destitute of any originality or elegance which can entitle them to rank above ordinary furniture and house decoration.

c. Columns, Pedestals, &c.

It is unnecessary to enumerate here all the exhibitors of columns, pedestals, &c., and only a few will be mentioned, which appear to require notice on account of material. Many of the others may have the same kind of merit of execution, which is, however, too simple to need description.

From Tuscany are several fusts of columns, one of which, sent by C. NOBILI (91), is remarkable for the extreme beauty of the material. It is a brecciated marble, of a remarkable soft brown colour, fine texture, and good polish, and is

well adapted for house decoration. It has been selected for Honourable Mention. Other columns from Tuscany, by GUIDOTTI (94), and MAFFEI (95), are not without considerable beauty, but they are not so new. They are for the most part of brecciated marbles.

The Belgian columns exhibited by the Viscount DESMANET DE BIESME (Belgium, 16), and Honourably Mentioned by the Jury, are chiefly interesting as examples of the black marble of the country. The French have contributed few objects of this kind.

Of English columns there are some of considerable interest. Two of large size and great beauty, adapted for church or palatial decoration, are sent by Mr. CHAMPERNOWNE (Main Avenue West 158), from a quarry in Devonshire, capable of yielding much excellent material, in slabs of large size. The marble is of the kind called "madrepore," being almost entirely made up of coral-limestone, greatly altered, but retaining its organic texture. The colour is good and richly varied, but it has the demerit of being cut the wrong way of the grain, and is huilt up as stone work although polished as marble. The Jury make Honourable Mention of these columns.

THE ROYAL DUBLIN SOCIETY (71) has sent bust-pedestals, one of a white marble and the other of a well-known green colour, both from Connemara. The latter is remarkable for its rich green hue and great beauty; and the selection of material being important in ornamental marble work. The Jury have made Honourable Mention of the Society for the success attained in the present collection. There are two marked varieties of colour of green Connemara marble, one being much darker than the rest. Mr. FRANKLIN, of Galway (73, and I. 144), has sent two black marble pedestals, one prepared for polishing and another finished. These show the quality of the material, which is unquestionably good, and both are from his neighbourhood.

Messrs. OLDFIELD and Co., Messrs. LOMAN and SONS, and some other exhibitors from Derbyshire, have supplied specimens of Derbyshire marbles of various kinds, which well illustrate the character of the stone and its uses. The so-called rosewood marble, which is one of them, has been already described. It is very beautiful, but so much harder than the others, that the saw will cut the encrinital marble of the same district three times as quickly.

Various pedestals of granite and porphyry are exhibited from Cornwall, but these will be elsewhere described.

d. Slabs, Table-tops, and Tables.

These objects are chiefly interesting in reference to the material of which they are constructed. Some of the marbles are beautiful, and a few are remarkable for rarity.

The Connemara marble tables, exhibited by Mr. LAMBERT (70), consist of two picked slabs from the Ballinahinch quarry, considered to be remarkably fine, and placed on pedestals of black Galway marble. There are flaws in the slabs, but they are Honourably Mentioned by the Jury as good samples of the material, which is worthy of more extensive use than it has hitherto obtained. The Galway marble is also exhibited by Mr. HUNTER (XXVI. 202). Mr. CHAMPERNOWNE (6)

exhibits a table of Devonshire marble, not very remarkable for beauty of material, but massive, well proportioned, and adapted for certain uses. An interesting and rather beautiful slab of the Plymouth limestone, used in the construction of the breakwater, has been formed into a table, and is sent by Mr. STUART (55). A magnificent slab of foreign marble is amongst the goods exhibited by the LONDON MARBLE WORKING COMPANY (17), and is worthy of notice for its excellent finish.

It is pleasing to observe amongst the goods sent from Canada a table of polished limestone or marble, the material the same as serves for ordinary building purposes in that colony. It is remarkably fine-grained, but the colour is not particularly ornamental. It is exhibited by Mr. HAMMOND (118), and is Honourably Mentioned.

A table is exhibited amongst the East Indian productions, the top of which consists of a slice of a column from Nineveh. It deserves attention from the condition of the limestone, though the material takes only an imperfect polish. It is the property of Colonel SYKES.

The slabs of marble exhibited by M. GUISLAIN, of Belgium (423), are good specimens of the ordinary material used extensively in that country, not only for ornamental, but for general domestic purposes. It is no doubt owing, partly, to the low cost of the labour required for preparing these slabs, and partly to the great abundance and variety of the material, that marble is so much more used on the Continent than with us; but it is worthy of consideration whether we might not introduce the cheaper kinds for many purposes of furniture, and in so doing, follow the example of our neighbours in France, Belgium, and elsewhere. M. Guislain has been deemed worthy of Honourable Mention.

The Italian marbles used for tables and slabs are sent by several exhibitors. Of these the Count DE GUIDO (Tuscany, 93) exhibits two of red colour and excellent quality. The material is little known. The Marquis PANCICCHI (Tuscany, 96) shows a good specimen of "lumachella," or fire marble, which is a dark brown shell marble, having brilliant fire-reflections from within. He also has two smaller tables. M. NANNI (Tuscany, 29) has sent a circular table, of the marble called *verde di prato*, and M. GUIDOTTI (Tuscany, 94), three tables, two round and one oblong, the latter of good colour, but not very close texture.

The ROYAL TECHNOLOGICAL INSTITUTE has also forwarded a number of tables of various kinds of marble, sufficiently described in the Catalogue. To these some reference has already been made in speaking of the Tuscan marbles generally.

There are but few proprietors of those numerous quarries in Germany which furnish the various marbles in common use, who have thought it worth while to forward for exhibition fair samples of their produce. Amongst these is, however, one, the RUEBELAND DUCAL ESTABLISHMENT OF BRUNSWICK (Prussia, 780), which deserves notice for the beauty of the slabs and the good condition in which they are sent. M. CANTIAN, of Berlin (Prussia, 235), has sent a beautiful slab of Prussian marble, very admirably executed. Of the former exhibitors, Honourable Mention is made for the group of objects they exhibit. The latter is rewarded with a Prize Medal, having sent several articles of considerable interest.

The collection of marbles cut into slabs and table-tops, and sent by M. J. J. FIGUEIREDO (Portugal, 248, 249, 252 to 257), has been Honourably Mentioned by the Jury. This series is exceedingly remarkable for the beauty and great

variety of many of the specimens, and illustrates the riches of Portugal in this respect. Some of the slabs, especially, must be very valuable if not too brittle for working, which cannot be positively ascertained in their present state. The specimens of M. Déjeant, of Portugal, have been referred to before, in treating of the collections of marbles from various countries.

The EGYPTIAN GOVERNMENT has sent a number of samples of that extremely beautiful marble known as "Oriental alabaster." This material is not really alabaster (sulphate of lime) in the modern sense of the word, but being of a very delicate colour, great clearness and transparency, and peculiar texture, it resembles that mineral which has indeed been named from it. The table-tops of this stone are very beautiful, and admirably worked and polished. They have obtained Honourable Mention.

From the United States but few specimens of marble have been sent; but we observe a very beautiful and well-executed table-top of yellow marble, resembling Sienna, sent by Messrs. DOE, HAZLETON, & Co., of Boston (418).

c. Miscellaneous objects in Marble, &c.

Miscellaneous objects in marble, alabaster, &c., are numerous. They include some fonts, a bust, a tomb, and various ornaments for the table and drawing-room, from England and Ireland. Numerous small toys and other objects are sent from India, with garden-seats; some vases and other things from Italy, and a few trifles from other countries. We proceed to enumerate them.

The fonts are several in number; some of white statuary marble, one of marble from Devonshire, and others of less pretence. Two of the former, exhibited by the LONDON MARBLE WORKING COMPANY (17), are plain, but of elegant design and good execution. The third is by Mr. PEYMAN (Nave, 87). The Devonshire marble font, by Mr. BOVEY, is a fair specimen of the stone, which is one of the richly variegated coralline marbles of Plymouth; but the material is not adapted to the object, nor is the style good, though the execution as marble work is praiseworthy.

A bust of Grattan, well executed in Irish marble, is very interesting, as proving the existence in Ireland of a highly crystalline, yellowish marble, adapted for the use of the sculptor, and more approaching the ancient Parian than anything known elsewhere in Europe. This marble is from Dunlavy Quarries, county Donegal, and the quality may be expected to improve, if the quarry should be further worked. It is exhibited by the proprietor, Lord MONTEAGLE (72), and is Honourably Mentioned by the Jury.

Mr. PORTER (66) has a collection of small objects in Connemara marble, all of Irish manufacture, and very neatly executed. Some small table ornaments by Mr. RUMLEY (59), Mr. WISHAW (61), and Mr. SIMMONS (Class XXX. 126), may also be mentioned as neat and ingenious. A pair of small obelisks in polished oolite exhibited by Mr. J. BELL (57), are very pretty illustrations of the material, and are well finished.

There still remain to be considered the ornaments of black and other marbles, chiefly from Derbyshire, exhibited by Messrs. HALL and TENNANT (35); SELIM BRIGHT (80), and J. TURNER (82). The first (TENNANT and HALL, 37 & 38), have sent a fair variety, which have been considered worthy of Honourable Men-

tion, as exemplifying the present state of taste and skill in working marble in the district in England where the greatest pains have been taken, and where the improvement is of longest date. Mr. Bright's vases are also Honourably Mentioned.

The series of Derbyshire goods, by these exhibitors, is in some respects excellent, and the imitations or models from the antique, especially the obelisks, both of Egypt and Nineveh, are very pleasing. The process of etching on marble illustrated by some of the objects they exhibit, is also shown by Mrs. RAYNER (Class XXX. 47) and Mr. E. BIRD (83); but as it is not likely to lead to any improved process, and is of itself only an ingenious but unfit application of one of the Fine Arts to a material ill adapted for the purpose, the Jury make no further remark upon it. The two vases, sent by Mr. BRIGHT, and the jugs by Mr. TURNER, all of black marble, are of elegant shape and perfectly well finished. Mr. VALANCE, of Matlock, whose most important objects will be spoken of amongst inlaid work, has sent several articles of marble, among which may be mentioned five vases, some of good forms taken from the antique, an obelisk, three ink-stands of black and rosewood marble, and a Roman bath of the same material. These are good specimens both of material and manufacture.

A tomb in alabaster, by Mr. CUNDY (Nave, 60), being a clever illustration of what can be done in this material, is considered by the Jury as worthy of a Prize Medal.

If from the British goods of this kind, we turn to those of other countries over which England holds rule, we shall find a number of striking and beautiful manufactures in marble sent by various persons from India, amongst which may be especially mentioned, the handsome white marble garden-seats, understood to be a present from the RAJAH of NATTORE to Her Majesty, and a large collection of objects of the same, or nearly the same material exhibited by the RAJAH of JOUDHPOOR. These latter, amounting in number to 56, are perhaps more curious than beautiful; but they illustrate well the capabilities of the material. The former exhibitor has been considered worthy of Honourable Mention. Besides these things from India, there are a few specimens of manufactured marble from Van Diemen's Land, sent by Mr. J. BOYD (233). These have been Honourably Mentioned by the Jury.

From France the miscellaneous objects in marble are but few, except those where marble is applied to furniture, and general purposes of decoration, combined with wood-work. Mr. SIMON, however (1016), has some marble ornaments.

Germany, like France, contributes few objects in marble of a miscellaneous character. There are, however, a model of a chandelier by M. NOE (418); a fountain by M. TACCHI, of Frankfort (21), and some small ornaments from the manufactory of Diez, in the Duchy of Nassau (5). The model by M. Noe has been deemed worthy of Honourable Mention.

The working of marble has been so long a staple manufacture of Italy, that we might well expect from that country a preponderance of such objects as illustrate the varied applications of this material to the arts, and to decorative purposes generally. To a certain extent, this is the case; but, although most of the productions of Italy are ornamental, they are not pre-eminent for novelty or variety. Among them, however, are some of extreme beauty and rare excellence.

The most remarkable of these objects, strictly belonging to the class of mineral manufactures, is a large vase of Oriental alabaster, executed by the Signor T. DALLAMODA (Rome, 19). The material is peculiarly adapted for such a work, but it is not usual to obtain so large a block absolutely free from imperfection. In the execution of the vase, the handles, which consist of serpents, are of the same piece with the body of the tazza, so that the artist could not have used the lathe, either on the work itself, or in polishing. In most modern works of the kind, the handles are joined on after the completion of the object; and the great difficulties of marble-working are avoided (when there are no bas-reliefs round the outside), by placing the object between two centres. A considerable difficulty was involved in the nature of the material employed, and the necessity of chiselling away extremely minute portions in finishing the handles. In those parts which are most original, the perfect steadiness of the sculptor's hand is observable, and the confidence—amounting almost to rashness—in his own knowledge and experience. The whole of the tazza has been finished with the greatest care, the polish being everywhere complete, no part being at all injured, and every detail tending to produce the beautiful effect which has been so greatly and justly admired. The Jury have awarded a Prize Medal to this exhibitor.

From Rome we also have a number of other works; some of them by the same artist, and in the same material; but others by Mr. Van der Staat, exhibited by the proprietor, Signor DIES. Among them are some models of architectural constructions and antiquities, in fine Sienna marble, and a hollow altar of Oriental alabaster provided with a lamp, and intended to show the remarkable translucency of this material. All these are of excellent workmanship.

From Tuscany are exhibited several objects, constructed of the true alabaster, so abundant near Volterra. Among these a very beautiful and large vase by Messrs. G. CHERICI and SONS, is Honourably Mentioned by the Jury, as well for the material as for the treatment of the subject and the mechanical execution. There is also a pair of large candelabra of brown alabaster exhibited by SOLAINI, of Leghorn.

Among the objects properly belonging to this group, may be mentioned, in conclusion, a baignivola of lapis lazuli, extremely remarkable for its large size, and for the extreme purity and richness of the colour. For these reasons it is of great value, but has little beauty of form or excellence of workmanship. It is exhibited by Mr. Jones (Rome, 48), and is considered worthy of Honourable Mention.

F. WORKS IN ORNAMENTAL STONE, GRANITE, AND SPAR.

a. Serpentine, Granite, and Porphyry.

We bring together these materials more for convenience than for any marked similarity in the modes of working. The serpentines of England are not harder than the commoner marbles, and are worked in the same way; whereas the granites are extremely hard, and require peculiar treatment. There are not many exhibitors in these materials.

To Mr. J. ORGAN, of Penzance in Cornwall (85), a Prize Medal is awarded for his fine and well-selected group of objects, manufactured in the serpentine of

the Lizard. The material, employed only by Mr. Organ and one other exhibitor, is an extremely beautiful marble of moderate hardness, differing essentially in this respect from the serpentine of Italy and Greece. The colour is extremely varied, but that which is commonest and most admired, is a rich, dark olive-green, spotted with red, and traversed with veins, often of the purest white, but sometimes of dark crimson. The articles exhibited by Mr. Organ are remarkable for their large size, and the good taste they manifest, as well in the style of manufacture as in the selection of the specimen for the kind of work. They include a pair of obelisks, a font, and a chimney-piece, besides vases, and other smaller ornaments.

The exhibitor has the right of quarrying over an extensive district, chiefly occupied by the serpentine: the work is generally pursued in summer. About one ton in four of the rock is of fine quality; the blocks are generally small, though they have been obtained 7 feet long, and from three to five tons weight. A very beautiful and large specimen, partly polished, is exhibited outside the western end of the Building (No. 1). It may be well to state, that the cost per ton is from 5*l.* to 10*l.*, according to weight, and the price of slabs 1½ inch thick, and not exceeding 5 feet long, is 6*s.* per superficial foot from the saw, and 12*s.* per foot moulded and polished.

Mr. W. PEARCE, of Truro (75), is an exhibitor of various objects manufactured from the serpentine of the Lizard, from steatite, also from the Lizard, and from the fine granite from Lamorna, Withiel, Luxulian, and other places in Cornwall. The whole group is of remarkable excellence, and the Jury have awarded a Prize Medal to the exhibitor.

The steatites of the Lizard differ little from the serpentines in their essential components, both being silicates of magnesia; although the former contain a larger proportion of silica, and the latter much more water of consolidation. Both minerals vary, however, much in composition, when in a massive state, and probably pass into each other in the Lizard rock. The serpentine is much harder than steatite, and is generally more richly coloured, so that the latter, although often beautiful, is better adapted for smaller objects than the former, which, when in large blocks, has a rich and noble effect. Many of the small articles by this exhibitor, manufactured of steatite, are well worthy of notice.*

Mr. Pearce also exhibits several pedestals, a large slab, and a chimney-piece of granite, and pedestals of porphyry. The style of the chimney-piece is heavy and massive, but not unsuited to the material; and its workmanship is decidedly good. The difficulties in bringing granite and porphyry to a perfectly plane surface without the lathe, have been very successfully overcome in the case of the slab or table-top, which is of large dimensions, and exhibits no flaws, and no imperfections of work.

Mr. J. H. MEREDITH, of Fowey (I. 141), exhibits three noble slabs of Cornish porphyry, one black, another red, and the third green; all of fine quality, and polished on both sides. The largest, which is of a fine red colour, took

* The articles here described are constructed of the more ornamental specimens of steatite and are highly polished. Those previously alluded to (p. 1229) are for economic purposes and are left rough. The material slightly differs also in composition.

nearly four months to complete, the cutting being done by machinery, and the work going on night and day. It is absolutely without flaw or defect, and weighs about 8 cwt. The material is so beautiful, and the work so excellent, that the Jury have no hesitation in awarding a Prize Medal to this exhibitor.

The quarries from which these fine specimens of Cornish porphyry are obtained, were first worked by Mr. J. T. Treffry, of Place, who commenced the erection of a hall, in which the various specimens are exhibited, and who greatly exerted himself to introduce the use of this material for decorative internal work, and for the Fine Arts.

The only exhibitors of Scotch granite in articles of any magnitude, are Messrs. MACDONALD and LESLIE (74), of Aberdeen, who have sent two vases, a pedestal, and a noble slab for a table-top. The Aberdeen granite differs from the Cornish in being for the most part finer grained, and of a peculiar flesh tint. The specimens here exhibited are of the finest kind, and their workmanship is unrivalled. They are also in good taste, and although the material is not without flaw, this may be excused, when the large dimensions of the different objects, and the rarity of perfect blocks are taken into consideration. To these exhibitors a Prize Medal is awarded.

There are one or two exhibitors of granite manufactured into articles of small size, and almost partaking of the nature of jewellery. Such are Mr. G. JAMIESON, of Aberdeen (Class I., 25), Messrs. RETTIES and SONS, of Aberdeen (Class XXIII., 24), and Messrs. ELLIS and SON, of Exeter (Class XXIII., 12), the former of whom show some elegant forms sculptured in Aberdeen granite, and the latter, knife-handles in similar material from Devonshire.

Of foreign porphyries there are few examples in the Exhibition, but amongst these we may mention a table, small column, and tazza, exhibited by Mr. CANTIAN, of Berlin (Prussia, 235), with some marbles also worthy of notice. The table is a round slab of red colour and fine texture, and the tazza vase and pedestal are of the same material. They are all well-finished and creditable specimens, whether as regards material or execution. They are accompanied by a small column of polished garnet rock of very singular appearance. The Jury have awarded a Prize Medal to this exhibitor.

In the Scandinavian compartment there are several objects constructed of a very hard syenitic porphyry, found in detached boulders (erratic blocks) in various parts of Sweden, and also *in situ* in Norway. Of these, that numbered 43 is from the Hjula quarry, in Norway, and is of a greyish-red material, probably rare. The Jury have awarded Honourable Mention to the Swedish porphyry work generally, including not only this vase but another exhibited by Mr. Wallis (47).*

* In the early part of the month of September, and after the awards of the Jury had been finally determined on, a number of very beautiful objects were added to the Scandinavian exhibition, among which was one vase of polished granite of gigantic proportions, sent by His Majesty the King of Sweden, and manufactured at the Royal porphyry works of Dalecarlia, instituted to supply work for the poor peasantry. This vase is of very peculiar form, the principal and central portion being egg-shaped, and measuring 6 feet in height and 4 feet 4 in. in diameter in the largest part. Much larger objects have indeed been made in these works, one highly finished tazza being described, the diameter of which is no less than 11 feet, but this was too large to be safely conveyed. The vase is of a delicate pink granitoid porphyry, and is extremely admirable and perfect both in design and execution.

M. COLIN, of Epinal, in the department of the Vosges (France, 156+), exhibits a collection of the marbles, granites, and serpentines, of that part of France. Some are of considerable beauty.

A vase and group of figures in Italian serpentine, exhibited by Mr. Norchi (Class XXX., 309), are mentioned here simply as illustrations of the material. Two large vases of a peculiar material called agate marble, harder than alabaster, and nearly as transparent, may also be seen among the objects sent by this exhibitor.

b. Jasper, Jade, Agate, Crystal, and Spar.

The jasper and quartz rocks of Siberia, well known as materials of extreme hardness, worked only in the Russian empire, and rarely met with except as Imperial presents to princes and distinguished foreigners, furnish a group of very remarkable objects exhibited among the Russian goods, and deserving of notice on all accounts.

The material of some of these vases is quartz rock, but most are of a kind of pseudo-jasper, or pseudo-jaspic lava, of greenish colour and extreme toughness and hardness, resisting almost every tool, and requiring to be cut with emery in the manner of gems. These rocks chiefly exist in Siberia, beyond the Oural, and are in great abundance and variety. The vases exhibited from Russia are of this jaspic rock, and were worked at the Imperial manufactories of Ekaterinbourg and Kolywan. In these manufactories it is stated that almost the whole of the work is performed by manual labour; the only machine used being, in fact, a very simple kind of lathe, on which the object to be turned is placed, and worked by iron tools and emery. No tool will touch these stones: both chisel and file of the hardest temper turning without producing any effect. The time necessary for finishing vases of considerable magnitude is often many years, and their value must be calculated by the cost of the large establishment kept at constant work for the sole purpose of preparing them.

Of the works of this kind in the Exhibition, there is one of square form at the top, measuring nearly three feet on each side, hollowed under the rim, and ornamented with foliage in the hollow. This vase is worked with great skill and accuracy; but the colour of the jasper is not satisfactory; there are also some flaws: the size, however, is unusually large, and the labour of execution must therefore have been enormous. It was made in the Imperial Polishing Manufactory of Ekaterinburg, in Perm (Russia, 326), to the Official Director of which the Jury have adjudged a Prize Medal.

Several vases of smaller size are sent from the Imperial Manufactory of Kolywan, Government of Tomsk, Siberia, for which a Prize Medal is also adjudged (Russia, 327). One of them is very beautiful, both in form and material, being an olive-green jasper urn, decorated with admirably worked foliage in relief. The successful execution of some of the leaves must have involved extraordinary difficulties.

Although the vases exhibited from Russia are not, perhaps, the largest that have been prepared, the Jury are desirous of recording the expressions of their Chairman, in a memoir submitted by him to the Jury. "Such are the dimensions and weight of these masses of *pietra dura*, that I must say I know of no similar

works; nor do I believe that any so difficult and well-finished have been executed since the times of the Greeks and Romans. As examples of the same kind, and of those times, I would cite the statue of Rome in the Capitol, and a very beautiful fragment of drapery most exquisitely worked, both which are of porphyry. There are also, in Rome, some beautiful busts, of the size of nature, and of the most perfect finish in basalt."

A large number of works in jade are exhibited, from India and China, together with a number of objects carved in quartz rock (rock crystal), many of them inlaid with gems, and of extraordinary richness and beauty. These works in crystal and jade involve nearly the same difficulties as those of jasper, just described; but many of them are of so small a size that they rather come under the denomination of jewellery, and are the work of the gem-cutter rather than of the sculptor. The same may be said of numerous objects in agate, cornelian, and other material, no doubt considered by the Jury of another class. The objects of this description from India are remarkable for admirable execution and elegance of shape. Those from China are equally well executed, but often exhibit monstrous and distorted forms. As, however, the members of the Jury were not permitted to examine the goods from China, they are not justified in recommending any reward to the exhibitor. The agates cut into various forms and exhibited abundantly from India, are well worthy of notice as mineral manufactures, but have been fully described both with reference to the material itself and the modes adopted in working it, in the Illustrated Official Catalogue. There will be found in that Catalogue, a very interesting account of the large trade in hard stones and gems now regularly carried on in India; and great advantage might accrue if advantage were taken of the price of labour in the East, and opportunity given for supplying the European market with various articles made of these substances, and used in the arts.

The transition from gem-cutting, on this gigantic scale, to the true work in *pietra dura*, known as Florentine mosaic, is easy and natural. The material used in this latter kind of work is nearly the same in many cases, and the work differs only in its smaller size and greater delicacy of finish. Still the subject of mosaic or inlaid work is essentially distinct, and is more conveniently treated of under a separate heading.

Before concluding this part of the subject, it is necessary to allude briefly to the Derbyshire manufacture of fluor spar (locally called Blue John), often worked into vases and other ornaments. This material is beautiful, but rare, and requires great skill in working, owing to its extreme brittleness. It is only obtained in the massive state adapted for cutting from a single mine near Castleton. When the shades of colour are clear and well-defined, the mineral is used in its natural condition, and the fine specimens of this kind are very valuable; but in most cases it is necessary to expose the spar to heat, the temperature being regulated with great care. By these means some of the coloured bands become pale, and the remaining tints assume a peculiar purple or amethystine hue. All the varieties of colour of fluor spar are worked in Derbyshire; but the blue is the most esteemed. The manufacture of this material dates as far back as the middle of the last century.

The exhibitors of this mineral are, Mr. VALLANCE (40) (who has a gigantic vase 39 inches high, eight other vases, twelve tazzas, and several other specimens),

Mr. HALL, and Mr. TENNANT (37, 38), Mr. BRIGHT (80), Mr. WOODRUFF (77), and Mr. JEPSON (132). The objects are vases, tazzas, and sundry miscellaneous ornaments, chiefly small.

G. MOSAICS OR INLAID WORK IN STONE.

The art of mosaic (*opus musivum* of the Romans), originally applied only to the combination of small dice-shaped stones (*tessere*) in patterns, has very long been an important source of labour to the inhabitants of several parts of Italy, and, under various modifications, is now carried on in the principal cities of Europe. The manufacture has long ceased to be confined to combinations of *tessere*, and is now understood to include all kinds of inlaid and veneered work, in whatever material. We have here to consider those specimens in which marble and gems are the materials principally made use of; the Roman mosaics manufactured in glass being referred to a different group.*

With this limitation there are still several kinds which we may conveniently treat of separately. They are,—

1. Florentine mosaic, or work in gems (*pietre dure*).
2. Derbyshire mosaic, imitative of Florentine, but in marble.
3. Russian mosaic, or inlaid work in malachite.

a. Inlaid work in *Pietra Dura*.

This manufacture consists of certain kinds of hard stone inlaid in a slab of marble. They are, for the most part, those pseudo-gems, generally varieties of quartz, known under the names of agate, jasper, chalcedony, cornelian, &c.: but stones such as lapis lazuli, remarkable for their brilliancy and depth of colour, are also included, and come under the general denomination of *pietre dure*. In this kind of work, a slab of marble (generally black) of the required dimensions, and about an eighth, or three-sixteenths, of an inch thick is prepared, and the patterns to be inlaid are carefully cut out with the saw and file. The hard stones, worked into the required pattern by the ordinary methods of gem cutting, are accurately fitted into the spaces thus prepared, in a polished and finished state; for, if the whole were to be polished at once, some of the substances, being softer than others, would be worn away too rapidly, and the picture, instead of presenting a smooth surface, would be unequally polished, and the outlines would be granulated or chipped. The work, also, is liable to be spoiled by the accidental placing of one stone lower than another, and mistakes of this kind will often lead to the ruin of the whole. After the surface is thus prepared it is veneered on a thicker slab, and is then fit for use. In point of difficulty of execution, durability, and taste, this process of inlaying in hard stones, or gems, may rank as the most important purely decorative work within the whole range of mineral manufactures.

In order to illustrate the peculiar mode of inserting the different pieces of agate, jasper, &c., in these beautiful works of art, and to show also to those not familiar with them the elegant and simple forms produced, it has been thought desirable to prepare a diagram showing a fac-simile of a portion of the inlaid work in one of

* See p. 1271.

the tables exhibited. In this diagram the hard line represents the outline of the flowers, leaves, &c., and the dotted part the lines where the different pieces forming a single object are joined together. The extreme delicacy and accuracy of the joints can only be fully appreciated by the examination of the original specimens.



Fac-simile of inlaid work in Florentine mosaic.

The principal exhibitors of true Florentine mosaic in *pietra dura* are the Brothers BUONINSEGNI (Tuscany, 112), G. BIANCHINI (Tuscany, 113), and THE IMPERIAL MANUFACTORY OF PETERHOFF (Russia, 298). The two former exhibit good examples of the best manufactures of this kind. Most of the designs are in good taste, and all are admirably executed, but they do not present any great amount of originality. The Russian table is from a manufactory established for some time at St. Petersburg, originally worked by Italians, but now solely by Russians. The workmanship is in the highest degree creditable; but there is nothing original, either in execution or in the arrangement of the different ornaments. Many of the jaspers and other stones are of great beauty, and are obtained from Siberia. Most of the stones used in the Italian tables are pebbles from the Arno. Prize Medals have been awarded to all these exhibitors, but the latter establishment is especially rewarded for the relief work about to be described.

A very remarkable, and extremely beautiful variety of *pietra dura* work is exhibited in Russia. It consists of a jewel-case, understood to be the property of the Empress of Russia, constructed of wood, and having the four sides and top covered with groups of fruit cut in *pietra dura*, in a style which may be called *cameo-mosaic*, in rather high relief. The stones are so selected as to afford perfect fac-similes in colour, size, and even in internal structure, of the fruit they represent (currants, pears, plums, &c.), and the whole work is exquisitely finished. To the exhibitor of this, the Jury have also awarded a Prize Medal. They think it right, however, to add that, whilst fully admitting the extreme beauty of the general

effect, and of the particular stones selected, they do not regard this style of mosaic as ranking so high as the inlaying of tables, inasmuch as the separate pieces are here cut and shaped independently of each other, and cemented on the surface they are to decorate, without having to be fitted to adjacent pieces before imbedding. There is, also, little danger of failure, even if the dimensions do not strictly correspond.

The goods recently added from the Royal porphyry works of Dalecarlia, and already referred to, include an inlaid oblong table of granite, porphyry, and jasper, which deserves notice in this place, as well for beauty of workmanship as for design. The pattern is geometric, but very regular and elegant, and in very good taste. The materials are hard stones of the country, and the mechanical execution admirable; but being apparently of equal hardness, they admit of being polished after the whole is completed. It is exhibited by the King of Sweden.

Closely allied to the Florentine work, but of even greater delicacy, and employing material yet more difficult of management, is an Indian chess-table with an inlaid border; and a number of small objects also from India, inlaid in the same way. The ground in these is a white marble, showing a peculiar saccharoidal texture. The pattern is a fine scroll-work, remarkable for the extraordinary delicacy and exactness of the stems of flowers, and the perfect joints. It has been said that the stems are filled in with cement; but if this is so, which is unlikely, it is almost more extraordinary than the inlaid work, the stems being nearly as hard as flint. A Prize Medal was awarded for these objects. There is another interesting piece of Indian inlaid work, in *pietra dura*, said to be of great antiquity, obtained from Agra. It is exhibited by Mr. W. STEWART (33). No comparison can be instituted between these Indian and the European works, the mechanical execution of the former being at least equal to the best of those which have rendered Florence so justly famous, while the taste and design exhibited in them is greatly superior.

b. Inlaid Work in Marble.

The great expense of inlaying hard pebbles, which can only be cut as gems, and the excellent effect that may be produced by imitations, in which marble of various kinds, shells, cement, and glass, replace the jasper and agate of Florentine mosaic, have caused the introduction into England and elsewhere of a manufacture which may be called inlaid marble work. Specimens have been sent in great variety from Derbyshire, where this manufacture has become very important; from Devonshire, where it is rising into importance; and from Malta, where something of the kind has been for some time known.

There are two principal methods of producing marble mosaic; that followed in Derbyshire, where a recess is chiselled out of a solid block of marble serving as the ground; and that pursued in Devonshire, where the whole surface is, in fact, *veneered*, numerous marbles of various colours and forms being merely cemented on a base, which may consist of slate or any kind of marble, the whole surface being afterwards polished together. The Maltese specimens appear to belong to the former kind; while the Russian malachites, which we must treat of separately, may be regarded as more resembling the latter. At first we confine ourselves to the Derbyshire work, which is truly inlaid.

To a very limited extent, and by a very rude method, the art of inlaying in marble was practised in Derbyshire many years ago; but within the last quarter of a century it has made great and rapid advance, and about ten years since, the introduction of Florentine patterns, imitated in various coloured marbles, has exerted a very important influence on the trade.

The first manufacture of mosaic in Derbyshire consisted of coloured spars and marbles, of irregular shapes, imbedded in cement and afterwards rubbed down and polished; these were called "scrap tables," and were succeeded by slabs in which the spar and marble were cut into definite forms arranged in patterns; but these also were rudely finished, as the workmen were not skilled in the art of making accurate joints, and the forms selected were simple and geometrical. Up to this time the process was little more than veneering, and the results were rather imitative of brecciated marbles than intended to produce pictorial effect.

The present Duke of Devonshire, by permitting his fine collection of Florentine work to serve as a guide and model to the Derbyshire manufacturers, and even lending them the inlaid butterflies, leaves, sprigs of jasmine, &c., for which the Florentine mosaics are celebrated, induced an imitation of a higher kind. The true art of inlaying was thus brought into successful operation, and materials foreign to the vicinity, as malachites from Russia, continental marbles, aventurine, and other glasses from Venice, with some cements, have been introduced. The use of these substances greatly diminishes the cost of the work.

The condition of the trade at present may be judged of from the articles in the Exhibition, which show much taste and skill, though but little originality. The manufacture is carried on at Matlock, Ashford, Bakewell, Buxton, Castleton, and Derby, and the number of persons employed as mosaic-workers exceeds fifty. There appears to be a fair demand, and the prices, although sometimes high in London, are by no means extravagant at the place of manufacture.

Of the exhibitors from Derbyshire, Mr. VALLANCE (40) may be mentioned as having sent two octagonal mosaic tables, and several small objects. One of these tables presents a wreath of flowers, of extremely complicated pattern, and very admirably finished, in a vast number of detached marbles. This table was exhibited, and is mentioned by the Jury as a finished specimen of Derbyshire work; but it must not be compared with Florentine work, inasmuch as all the materials are comparatively soft, and they include a somewhat undue proportion of shell, glass, and modified marbles. It is, however, a very creditable piece of workmanship, and deserves great praise for the skill and labour bestowed upon it. To Mr. VALLANCE a Prize Medal has been awarded, not for these tables only, but for his general collection of Derbyshire marble manufactures, which is in a very high degree interesting and instructive.

A large round inlaid table, four feet in diameter, partly composed of the productions of Derbyshire, is exhibited by Mr. G. REDFERN, of Ashford (78), to whom a Prize Medal has been awarded. The general style of this table is good, and the marbles are well selected. There is, perhaps, in this, as in most of the Derbyshire inlaid goods imitative of Florentine work, a little too much use of glass, shell, and stained marble, which produce very brilliant effects, but are not altogether in such good taste as might be. An inlaid panel with a border by this exhibitor also deserves very great praise, both for design and execution.

Mr. WOODRUFF, of Bakewell (Class XXX., 350), exhibits two ohlong inlaid tables, in cinque-cento style, designed by L. GRUBER, Esq., and very well executed. The designs are particularly good and praiseworthy, and the Jury have noticed with much satisfaction that in this case effective aid has been afforded by an artist in elevating the mosaic manufacture of the district beyond the mere repetition of Italian patterns. It may be well to suggest here to the Derbyshire manufacturers, how much more creditable and ultimately successful it would be to place their work on a higher footing than it can be said to occupy at present, which might be done if the designs for their soft marble work were made with some reference to their material, which differs so much in hardness from the true *pietra dura* of Italy, and certainly admits of original treatment. In this view, and to mark their full appreciation of the originality of the design, as well as of the excellence of the workmanship, the Jury have awarded a Prize Medal to this exhibitor. In addition to these two tables, Mr. WOODRUFF also exhibits (77) a black marble chess-table with a pretty inlaid border, equally creditable for taste and execution, and two vases, one of black marble and one of changed flur already alluded to.

The other exhibitors of Derbyshire inlaid-work are Mr. J. TOMLINSON (77), who has several specimens, chiefly tables; Mr. S. BRIGHT (80), already mentioned for his black marble manufactures; Mr. J. HALL and Mr. TENNANT (37, 38), who exhibit together a number of articles of Derbyshire work, and among the rest various inlaid tables, and smaller objects of considerable merit; and Mr. LOMAS (81) who sends a chimney-piece of black marble, inlaid in mosaic, in a pattern to a certain extent original, though adopted from the antique. The attempt by this exhibitor to introduce good designs in Derbyshire mosaic into house decoration, is referred to with satisfaction by the Jury; and they consider not only the idea, but, in a great measure, the design and execution of the work as worthy of the Prize Medal. The inlaid work is well done, though the introduction of Sienna marble in the capital of the columns supporting the mantel-shelf is injurious to the general effect.

We pass on to the marble mosaics of other parts of England. Of these by far the best in every respect are sent from Devonshire, where the manufacture seems to be greatly advancing. To Mr. WOODLEY, of Torquay (39), a Prize Medal has been adjudged for one ohlong and two round tables, the latter of very great merit, and also of considerable interest as illustrating the marbles of the district. The Devonshire work is, as has been already said, rather a veneering than inlaying process; but the result is so similar in appearance to that obtained in Derbyshire that they can hardly be disconnected. Mr. Woodley's large round table is of the kind called specimen tables, and the forms are geometric, but the execution is excellent, and the selection of marbles admirable. There is not in any of the tables by this exhibitor any attempt at originality of design. The ohlong table contains a fine specimen of red marble.

Messrs. HOLLAND and SONS (Class XXVI., 161), exhibit a cabinet made for Her Majesty. This includes a certain amount of inlaid work in British marbles, well designed and well executed. The Jury consider the mosaic work in this cabinet deserving Honourable Mention. (Prize Medal awarded by Class XXVI.)

Mr. BOVEY, of Plymouth, is also Honourably Mentioned as an exhibitor of inlaid Devonshire marble, in a chimney-piece exhibited by him (4). The design of the work and the general effect are not particularly good, but the inlaying is well done and the selection of material praiseworthy.

Mr. HUMBLE (9) exhibits an octagon inlaid table, containing a mixture of British and foreign marbles. The design is geometric, and the execution tolerable. Mr. MOON, of Godalming, in Surrey (56), has an octagonal table, inlaid with several kinds of marble, and tolerably well executed; and another is sent by Mr. W. PEARSON, of Harrowgate (65), interesting as being chiefly composed of specimens from the neighbourhood of Knaresborough. Something of the same kind is shown by Mr. PLOW (50). It is satisfactory to find this branch of industry, which involves a considerable amount of skill, and admits of the display and cultivation of much taste, extending itself throughout the British islands, wherever material exists for its execution. In Ireland, also, the taste for such decoration is cultivated, and the Jury have pleasure in mentioning the tables sent by Mr. M. HOBAN, of Dublin (58), which show much skill in manufacture, although they admit of improvement in design. Lastly, a mosaic chess-table is exhibited by MESSRS. QUILLIAM and CREER, manufactured in the Isle of Man, of Manx material.

Inlaid work has been executed for some time in Malta, on a considerable scale, and on a plan imitative of that pursued in Tuscany. Several tables have been sent for exhibition, and the Jury have awarded a Prize Medal to Messrs J. DARMANIN and SONS, of Valetta (Malta, 26), as an acknowledgment due to them for the design and execution of the specimens they exhibit. In these a black marble background is introduced for the inlaying, which generally shows much accuracy of work with a very skilful use of material to produce the desired effect.

The designs introduced into the Maltese tables are, to a certain extent, original. The variety is also considerable, but there is generally a largeness in the details, which rather injures the effect, in other respects very good.

The polished inlaid work in stone sent from France is connected so closely with articles of furniture, and offers so little specially belonging to the present class, that the Jury have not thought it necessary to report specially upon each specimen. They notice, however, a table, by Mr. J. P. BOSSI, of Paris (France, 773), having an elegant scroll pattern of inlaid marbles, amongst which are some stones of harder material. The design and execution of this table are good; and the selection of material is worthy of notice. A Prize Medal is awarded to the exhibitor. There is also another Medal awarded to Mr. THERET (France, 1499), for sundry articles of furniture, decoration, &c., showing some originality and much excellence of workmanship.

Few inlaid works of any kind, in which marble is introduced, are exhibited from the States of the Zollverein. One set of tables and slabs, &c., are however sent by Mr. DEVISSE, in which an artificial breccia is introduced with various kinds of marble. The style is that which we have already referred to as belonging to the earlier period of manufacture.

In addition to the exhibitors already mentioned, the name of Mr. GRÖGER, of Vienna (Austria, 631), may be added, as having sent a closet of ebony with mosaic ornaments, and some other inlaid work, tolerably well executed.

From Lisbon a somewhat interesting specimen of mosaic is sent by Mr. C.

BONNET (Portugal, 258), composed of sixty specimens, and various ornamental stones, all of the province of Alemtejo. This table was produced in the manufactory of M. Dejeant, a large exhibitor of Portuguese marbles.

From the Cape of Good Hope a peculiar kind of inlaid work in marble is sent, which, though hardly very ornamental, is not the less interesting, as illustrating the industry of that colony. Another specimen of somewhat different kind, in a geometric pattern, exhibited from Tunis, illustrates a similar manufacture carried on in the northern extremity of the same continent.

c. Inlaid Work in Malachite.

Malachite is a peculiar mamillated or stalagmitic form of the green carbonate of copper, chiefly found in an available state for inlaid work in a very few localities in Siberia, and lately in South Australia. It has been long employed in Russia in this manufacture. The mineral is remarkable for its fine emerald-green colour (often presenting several distinct shades in the same specimen), its brilliant and silky lustre, and compact texture. It is softer than marble, very much heavier, and by no means so easily worked, owing to its brittleness and the concentric arrangement it generally presents. It can rarely be found in masses weighing more than ten to twenty pounds, and good specimens have a very high value, as the finer kinds are used exclusively for decorative purposes.

The most important locality at present known for the finer kinds of Siberian malachite is in the copper ground of Nijny Tagilsk, in the government of Ekaterinhurg, situated on the River Tura, a tributary of the Irtysh, on the Siberian side of the Ural Mountains, in latitude $57\frac{1}{2}^{\circ}$ N., longitude 56° E. In a mine at this place, belonging to M.M. Demidoff, Sir Roderick Murchison has described an enormous mass of malachite, which, at the time of his visit, now several years since, had been recently discovered at the depth of 280 feet, strings of green copper conducting to it; and these strings, increasing in width and value, were found to terminate in a vast irregular botryoidal mass, estimated to contain not less than half a million of pounds of this valuable mineral.* The larger blocks, when exposed to the air, break up into smaller fragments rarely weighing more than from one to about four pounds.

* "The geological interest attached to this mass lies in the indication it affords, that the substance called malachite has been formed by a cupriferous solution which has successively deposited its residue in the stalagmitic form. 'Mutatis mutandis,' this mass has only to be viewed as formed of calcareous spar, and it presents every one of the features so well known to those who have examined stalactite grottoes with their stalagmitic floors in the clefts and caverns of limestone, or still more those large masses of tufa which have proceeded from calcareous wells. Wherever a portion of the malachite has been broken off, the interior is seen to consist of a number of fine laminae (a fasciculus of radio-concentric globules), which invariably arrange themselves equally around the centre on which they have been formed, and are adapted to every sinuosity of the pre-existing layer; here presenting a dark line, there a bright and light one, just as the solution of the moment, the day, or the hour, happened to be more or less impregnated with colouring matter. Besides round concretions, sometimes almost spherical, and also depressions of the surface, the under sides of this malachite are singularly analogous to that of any large mass of calcareous tufa, in presenting pendent finger-shaped stalactites, which are also composed of concentric laminae. The external surfaces of these concretions are frequently covered with a black ore of manganese, which usually falls on being touched."—Murchison's "Russia and the Ural Mountains," vol. i. page 374.

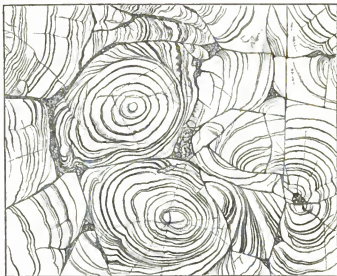
It is by no means a modern application of this material to employ it in inlaying or veneering for various decorative purposes; and few palaces, or large public museums in the principal capitals of Europe, are without specimens, marking the progress of the manufacture from time to time, and generally regarded, from their great rarity, cost, and beauty, as worthy of being made imperial and royal presents. It is, however, only lately that MM. DEMIDOFF, the owners of the mine in which the mineral occurs, have established at St. Petersburg a manufactory under the direction of M. LEOPOLD JOFFRIAND, where, after numerous trials, and the expenditure of much capital, labour, and ingenuity, it has been found possible to produce such works as those sent to the Exhibition. To MM. DEMIDOFF, the owners of this mine and factory, the Jury recommended, and the Council of Chairmen awarded the Council Medal, in testimony of the magnitude and importance of the objects exhibited, their extraordinary beauty and richness, the excellence of the production, and the application of various new methods of manufacture. These are chiefly seen in the construction of the doors, and more especially in the ingenious and beautiful manner in which the pattern is adapted to the material, the detached pieces of mineral being fitted to each other so as to preserve this pattern. They may also be noticed in the nature of the cement, which, being mixed with broken fragments of the malachite itself, does not interfere with the plan, or in any way injure the effect of the whole.

The working of malachite on a large scale is extremely tedious and laborious, and is understood to be thus conducted:—The fragments of the stone are first sawn into thin plates, the thickness of which, for plane surfaces, is about a line, and, for curved parts, a line and a half. This cutting is performed by means of vertical circular saws: the blocks of malachite being cemented on a carriage, which, by means of a counterpoise, is made to travel along a small railroad placed on rollers, and is so contrived as to present the malachite in such a way as to ensure the required thickness, and keep the mineral constantly pressed against the saw. Fine sand and water are continually supplied to the part in contact with the block, and the latter is thus slowly cut through, but retained in its position by means of the travelling frame already described. As soon as a plate is cut off, it is removed, the machine reset to cut another plate, and the work recommences.

The portions intended for curved surfaces are cut by bent saws fitted to the required shape, an operation which requires a large number of saws, and great care in cutting, as it would not be safe to trust to cement for filling up spaces, and some of the joints require to be very neat.

The next process in the manufacture is the fitting together the different plates, and cementing them. For this the first thing to be done is, to determine the pattern which the markings of the malachite are to represent. When this is decided on, the surfaces by which the separate fragments of the mineral are to be united are prepared, by the aid of wheels of copper, in such manner that for each joint two wheels are required, the projecting parts of one fragment entering a corresponding recess in the other. Joints thus made are not easily noticed, being formed with great accuracy, and not presenting any break or straight line to the eye. Until the establishment of their present factory by MM. Demidoff, the joints were straight, having no reference to the natural veins

or lines of the malachite, and thus surfaces were placed together in which these lines were not continuous, and had no relation with each other or with any regular pattern. The annexed diagram will show in some degree how this disagreeable result is now avoided. It is a fac-simile of a small part of the superbly executed pair of doors, which formed so prominent an object in the Russian Exhibition.



Fac-simile of a portion of veneered malachite. The joints are marked by fine dotted lines, and the darker portions represent the artificial malachite breccia or cement. The dark lines represent the natural concentric markings of the mineral.

The substance on which malachite is veneered is generally iron or copper, but may be stone or marble. When this is covered, the surfaces require to be levelled, which is done by means of sand. The interstices, of which many are left during the work, are then filled with a cement mixed with fragments of malachite, and coloured with powder of the same material; but in this part of the process, much care is required lest fragments should be introduced which do not adapt themselves to the pattern, and which would therefore injure the harmony of the work. The surface is finally polished.

In the above diagram any one acquainted with the usual veining of malachite, or even of stalagmitic carbonate of lime, will not fail to notice how completely the character of the natural markings is preserved in all essential places. When the nature of the work admits of it, however, the straight line is still preserved, as the joint can be made very accurate and extremely faint, although it is often purposely left thick and dark. In certain places, especially where a difference of pattern was rendered necessary, the presence of the breccia cement—which, owing its colour entirely to powdered malachite, is of precisely the same tint—forms an agreeable break, and greatly adds to the effect.

The quantity of malachite obtained from the mine, and brought into the market annually, is very small; and the price of the raw material is considerable, averaging about 16s. per pound avoirdupois. The loss in the manufacture being very great also, the cost is much increased, as one pound of the raw material after being sawn does not give more than half that weight of cut slabs; and this half is further reduced to a quarter of a pound before the slabs are fitted, cemented down, and polished. The ultimate value is thus upwards of three guineas sterling per lb. avoirdupois, and a square foot of finished work would generally contain at least two pounds and a half.*

The objects exhibited by MM. DEMIDOFF consist of a pair of folding-doors, several vases, a chimney-piece, a table, a set of chairs, and sundry smaller articles. Of these the doors and vases are at once the most important and the most highly finished; and it is understood that the former required the constant labour of thirty workmen employed by day and night during a whole year. They are most skilfully and beautifully planned, and the workmanship, as well of the plane as of the rounded surfaces, is, in all respects, admirable. The other objects are almost equally well executed, with the exception of the clock-stand, in which the joints are constructed according to the old system. It is said that there are in some of the churches, and perhaps elsewhere in St. Petersburg, fluted Corinthian columns of malachite, exhibiting the art of the manufacturer in a yet more striking manner than is seen in any of the specimens now in England; but certainly no examples have been seen out of Russia which at all equal in magnitude or artistic perfection those here described. It has been already stated that the Messrs. DEMIDOFF have received a Council Medal for these magnificent and costly objects, and the exhibitors are regarded by the Jury as worthy of the highest honour for the vast and successful efforts they have made to do credit to the manufactures of their country, and add to the interest of the Great Exhibition.

It would not, perhaps, be fair to institute a comparison between the malachite goods from Russia and those manufactured elsewhere; and certainly the articles exhibited of this kind from Paris and Derbyshire must be mentioned but as attempts in the same material. We have only, therefore, to state, that Mr. VALLANCE (40) has exhibited a large oblong table of considerable pretension, inlaid with malachite, partly Russian and partly Australian; and that a similar table of less pretence and much smaller size is among the goods sent by M. MATIFAT, of Paris (France, 923). The former is remarkable as introducing specimens in which azurite (blue carbonate of copper) is combined with the malachite; but the mechanical construction of the joints is according to the old method, and the lines of the different fragments are not connected so as to form a definite and recognisable pattern.

* By information received since this Report was in print, it appears that the prices vary from 12s. to 17s. per lb., according to colour rather than veining, the darker colours being cheapest. There are four shades quoted, denominated respectively *fonce*, *ordinaire*, *claire*, and *pale*; but these are also subdivided, the two first into *roudes* and *longues*, the others into *roudes*, *longues*, and *tachetées*. A large proportion of the malachite in the specimens exhibited was of very good colour, and the average value probably exceeded 15s. per lb., though it was less than 16s., as stated in the text.

Numerous small objects in malachite are exhibited, but none of these require special notice.

H. ENAMELLED SLATE AND OTHER IMITATIONS OF MARBLE

The present seems the fittest place for describing various modifications of stone, slate, and marble, which exhibit permanent and useful imitations of other more expensive materials. It is manifest that good and lasting imitations of the finer marbles, executed in stone, slate, &c., are calculated to add to the advantages that arise from the employment of ornamental work in furniture and decoration.

The only exhibitor of an imitation of this kind, whose works can be described as extremely remarkable and worthy of detailed notice, is Mr. MAGNUS, of Pinlicko (46), who, by means of a new, very simple, and inexpensive process, has succeeded in producing works of great magnitude and importance, calculated to effect the introduction of slate for household purposes on a very extensive scale. The advantages of the material as thus used consist in its great strength, its lightness, as compared with that of marble, and its adaptability to all kinds of artistic decoration at a small cost.

With regard to the strength of slate, it is computed to be about four times that of ordinary stone, and slabs 8 feet long and upwards can be very safely used of thicknesses not exceeding half an inch. The extreme compactness of the material, and its perfect non-absorbent qualities, render it well adapted as a lining for walls, where it may be placed without even plastering. In this respect it is preferable to any kind of cement. In the decoration, the exact method of laying on the colour is not communicated; but the slate, after being coloured, is exposed for several days to a temperature of from 300° to 500° Fahr., and the colours are thus rendered so permanent that washstand tops and other articles used in hotels for years, have been scarcely injured by wear. In respect also of its peculiarly smooth and perfect surface and fine texture, it is admirably adapted for various ornamental and useful purposes; and grooves, mouldings, &c., are run with great despatch and at small cost by steam power.

In point of execution, both mechanical and artistic, the greatest possible credit is due to this exhibitor. He has produced a vast variety of articles, many of which are now in common use; and, in all, the price is so very much less than that of the substance imitated, and even of any other imitation that can at all compete with it, as to ensure a large and permanent demand from the public.

The most remarkable object exhibited by Mr. Magnus is a bath-room of large dimensions, good design, and great beauty, wholly manufactured of decorated slate. The peculiar effect of the slate, as enamelled for use, is perfectly well shown in this specimen, which has received the careful attention of the Jury.

The following is a list of some of the principal objects manufactured by this exhibitor:—Chimney-pieces, table-tops, pilasters, skirtings, sideboards, billiard-tables, ornamental dairies, monuments, mural tablets, altar tablets, sun-dials, clock-faces, pedestals, baths, vases, chiffonières, candelabra, lamp-tubes, &c. Of all these, the billiard-tables are, perhaps, the most important, as being decidedly superior to tables constructed of any other material. Slate for the bed of the tables has been employed for some time; but as its weight caused the mahogany

legs to become rickety, slate legs and frames have also now been introduced by the exhibitor, which, being dove-tailed together, the use of iron is avoided, and the tables are steady and durable.

To this exhibitor the Jury have had no hesitation in awarding a Prize Medal, in acknowledgment of his admirable and useful contrivances and applications.

Mr. T. STIRLING, jun. (Class I., 209), who exhibits a large collection of unpolished slates already fully described (see page 1227), and who has been adjudged a Prize Medal for these objects, has included within his group several specimens of enamelled slate highly decorative, but not prepared in the method adopted by Mr. Magnus. Mr. T. STIRLING, sen., (Class XXVII., 120,) has also exhibited similar articles consisting of tables, inkstands, &c. These are handsome, and some of them show artistic merit, but they cannot be compared with the results obtained by Mr. Magnus.

There are several exhibitors of imitation marbles on slate and stone. Mr. BRADLEY (35) has a small slate table, carefully painted in imitation of Devonshire marble. Mr. HALL (42) illustrates the method of writing on slate. Mr. THORNHILL (48) shows a pair of tables also imitative of marble.

DIVISION II.—MINERAL MANUFACTURES IN PLASTIC MATERIAL AND ARTIFICIAL COMPOUNDS.

Under this head it is meant to include manufactures in cement and artificial stone, scagliola work, and glass mosaic; manufactures in all varieties of clay, including bricks and tiles, fire-clay goods, stoneware, and terra cotta; and manufactures which have been referred to this class but are of a miscellaneous character, falling more naturally under this than any of the other divisions.

It may be necessary to state, as a more complete definition of the groups suggested, that all materials in which distinct chemical action takes place before they assume the form in which they become marketable, are regarded as *cements*, while those that are simply burnt, whether surface-glazed or not, are regarded as *clays*. The common cements and plasters, and various articles of manufactured glass, &c., considered to belong to this class, as Roman mosaics, thus belong to the former group, while terra cotta, salt-glazed ware, fire-clay goods, &c., are referred to the second group, being considered as manufactured clays.

Group 3.—MANUFACTURES IN CEMENT AND ARTIFICIAL STONE, &c.

The number of exhibitors in these materials is not very large, nor are the objects exhibited numerous or from many countries, but they are by no means unimportant. They include, however, the remarkable and beautiful mosaics in glass, manufactured chiefly in Rome, besides a number of other mosaics, and some miscellaneous articles not fitly included amongst glass and porcelain. They consist, however, principally of all the varieties of manufactured cements, such as simple concretes and mortars, Roman and Portland cement, plasters of various kinds, scagliolas of all kinds, and many other like objects.

Of twenty-one English exhibitors in this group almost all have illustrated the decorative as well as the more substantial uses of cement, while several have only

sent the former kind. Italy, which comes next in order is much more remarkable for the beauty of the manufactures, the list including no less than seven exhibitors in Roman mosaic, and two in inlaid scagliola. From various parts of Germany, including Austria, there are about eight exhibitors, chiefly of the less decorative kinds, and from France there are six also little decorative. Belgium has two exhibitors in ornamental cements, and Greece one in puzzuolana.

I. MASSIVE AND INCRUSTED CEMENTS.

Under this head will be included common mortar and other simple lime cements, Parker's, Portland, Medina, and other hydraulic cements, various artificial stones (not terra cotta), and scagliola work of the usual kind, as well as new modifications of this manufacture. It may be expedient to explain very briefly the basis of the various cements here enumerated, and the chemical principles involved.

When common limestone of any kind, unmixed with other mineral substances, is exposed to considerable heat, it changes its appearance and character, swelling out, and passing into a white powdery material, greedily absorbing water with the evolution of much heat, and known under the name of *quick-lime*. If a paste is made with this lime and water, and the mass be exposed to the air, the result is a loose and friable hydrate of lime; but if a thin bed of such paste is interposed between two porous stones or bricks, the water is absorbed into these substances, and the thin bed of hydrate of lime that remains takes the consistence of stone, and adheres strongly to the two surfaces with which it is in contact. This is assisted by mixing the paste with sand and gravel, to the extent of two or three times its own weight, since the adhesion is greater to the foreign substances than to the particles of the hydrate of lime itself. Such a mixture is the common *mortar*, used by masons and bricklayers, and as it only hardens after exposure for some time in dry air, it is not surprising that in damp places it sets with great difficulty, and in water has no tendency to consolidate at all. When it is required to fasten stones and bricks together in moist places or under water, another substance is needed, and this is called *hydraulic lime*, or *hydraulic cement*.

There are, however, many kinds of hydraulic lime. The simplest is obtained when about 10 or 15 per cent. of clay (silicate of alumina) is combined with the original limestone, and when the calcination is not carried too far. In this case the resulting lime solidifies under water, the hydrate of lime combining with the silicates of alumina and lime, and producing a new substance, insoluble in water.

Many calcareous clays or argillaceous limestones exist in nature, having such properties as lead to this result. When the proportion of clay is only about 10 or 12 per cent., the mortar made from them takes about 20 days to harden in moist places. When, however, the proportion of clay reaches 20 to 25 per cent., the hardening is complete in two or three days; and when it exceeds this, and is as much as from 25 to 35 per cent., the ratio of drying varies according to circumstances, but may be very rapid. One kind of lime obtained from such an admixture of material as the latter is called Parker's, or Roman cement, but there is much difference in the quality of the material, greatly affecting the value of the result. It is generally considered that a minute division of the clay, and a state in which

part of the silica is given up on the application of caustic potash, gives the best results.

Roman or Parker's cement is made in England from nodules of calcareous matter, collected in bands in the London clay of Sheppey and Harwich, the Oxford and Kimmeridge clays (chiefly from Weymouth), and other similar deposits. Sometimes (especially in the former case) these have been washed out to sea and are there dredged up. The so-called Medina cement is of this kind but of lighter colour, and is made from the Hampshire septaria. A large quantity of excellent hydraulic mortar is also made from the lias (known as Atkinson's or Mulgrave cement) and from some other rocks. The price of Roman cement is now from 30s. to 40s. per ton, and upwards of two millions of bushels are annually made from the material obtained from the Essex coast, near Harwich.

A most important hydraulic cement, called *Portland cement*, is made from carbonate of lime, mixed in definite proportions with the argillaceous deposit of some rivers running over clay and chalk, pounded together under water, and afterwards dried and burnt. The strength of this combination is very remarkable, being nearly four times as great as that of any natural kind. Portland cement makes an admirable and most powerful concrete, the proportion of cement required being only a tenth or twelfth part.*

It is not difficult to procure artificially mixtures of limestone and clay, which are less costly than the natural kinds, though not equal in value.

On the Continent similar material is obtained in various localities, of which we may mention Boulogne, Vassy, Pouilly in Burgundy, and some parts of Russia. In some cases these cements appear to owe their hydraulic qualities to the presence of silicate of lime and silica rather than clay.

Certain substances also exist in nature, and can be imitated by art, which, on being mixed with common quick-lime, form hydraulic mortar. These are called *puzzuolana*, and consist generally of volcanic ash, of which a vast quantity is found in the modern volcanic districts of South Italy, Greece, &c., and in the extinct volcanic districts of the Rhine, Auvergne, &c., but similar substances are found in our own country. Mortar made with *puzzuolana* has extraordinary hardness and durability, this substance having a great affinity for lime and hydrate of lime, and forming a perfectly insoluble compound.

The cements hitherto described are composed essentially of carbonate of lime, from which both the carbonic acid and water are driven off by burning in a kiln. Another group, however, exists which we may call *plasters*, of which the base is sulphate of lime, or gypsum, usually found in combination with nearly 2½ per cent. of water, and often containing carbonate of lime and clay in small proportions. On being burnt at a low temperature this mineral simply parts with its water, which it absorbs again readily, and with great rapidity, on subsequent exposure; but if a greater heat is applied it melts, and when cooled assumes a new and permanent form, not altered by wetting.

The property possessed by gypsum, of parting readily with its water of solidification, and reabsorbing it as readily, is the basis of a vast variety of uses to which this mineral is applied. When mixed with water mechanically, after being

* See an account of experiments on the strength of Portland cement page 1285.

calcined, a part of the water enters into combination with the powder, and forms a true hydrous sulphate of lime, which collects into minute crystals, fitting into each other, and the mass becomes rapidly solid, although not very hard. If the solidification takes place in a mould, the most minute cavities are found to have been filled, and the result is a perfect cast, owing to the expansion that takes place while solidification goes on. Thus the calcined gypsum, mixed with water, becomes an admirable material for casting, and is greatly used for this purpose. Vast quantities of gypsum, of various degrees of purity, are found in the immediate vicinity of Paris, and thus the powder obtained after burning is generally designated *Plaster of Paris*. It is employed very extensively in constructions for various kinds of internal work. *Stucco* is a combination of the same substance, with a solution of gelatine or strong glue. This mixture dries more slowly than that made with water, but is more durable.

Sulphate of lime is the basis of all the cements known as *Keene's*, *Martin's*, *Parian*, and some others, but in these the plaster in the state of fine powder is thrown into a vessel containing a saturated solution of alum, sulphate of potash, or borax. After soaking for some hours it is removed and air-dried, and subsequently rebaked at a brownish-red heat. When taken out of the oven it is once more reduced to a fine powder, and carefully sifted, after which it is fit for use, but when slacked a solution of alum is employed instead of pure water. When borax is used, the plaster is called *Parian*, but in the other case it forms *Keene's* cement. The kind called *Martin's* cement is made with pearlsh as well as alum, and is baked at a much higher heat than the rest.

The raw material for these various cements, of which the consumption is now extremely great, is obtained from Derbyshire, Nottinghamshire, and Cumberland, besides the neighbourhood of Paris. The quality differs much, but for the finer kinds of cement the most crystalline is considered the best. Vast quantities of gypsum exist in Tuscany, much of it in the crystalline form called alabaster. The English gypsum is sometimes in beds of very variable thickness, sometimes in lenticular masses, and occasionally in veins. It occurs extensively in the new red sandstone, but also in the clay deposits of the oolitic period. The harder kinds make the soundest plaster, containing generally a little lime, but the purer kinds are much whiter when burnt. In France the gypsum is burnt in open kilns, and is thus discoloured, but in England this is avoided, the fuel not being allowed to come in contact with the plaster.

A highly ornamental material, consisting of a coating of plaster mixed with alum and colour into a paste, and afterwards beaten on a prepared surface with fragments of marble, &c., has long been known under the name of *scagliola*, and is greatly used as an excellent and economical means of imitating the finer kinds of marble, the material being as hard as marble, very durable, cold to the touch, and taking a perfect polish. The name *scagliola* is derived from the Italian, where the process is said to have been invented more than two centuries ago, but it is now very extensively used for decorative purposes in England. The cement is prepared from the finest gypsum, broken up before calcining, and afterwards reduced to a fine powder and passed through a sieve. It is then mixed with aluminous matter, and singlass, and also with colouring matter, and is afterwards made up with alum; and as it is generally made use of only where the more

beautiful and veined marbles are to be imitated, as many different colours and shades of colour must be mixed up separately as there are in the kind of marble to be represented. Thus prepared, it is ready to be laid on to the surface intended to receive it, which has a rough coating of lime and hair already prepared.

The different colours having to be laid on and mixed by the hand, the work somewhat resembles that of the fresco painter, everything depending on the skill of the operator in imitating the style, beauty, and veining of the original. When the cement is laid on and has hardened, the surface is prepared for polishing by rubbing it with pumice-stone, and cleansing with a wet sponge. It is then polished by rubbing, first with tripoli and charcoal, then with felt dipped in tripoli and oil, and lastly with oil alone. A durable lustre is thus obtained, equal to that of marble.

With this general outline of the nature and use of the various cements and plasters in which carbonate and sulphate of lime are the essential ingredients, we pass on now to the different exhibitors in these materials. There are several in each, chiefly from our own country and Italy, so far as larger and more ornamental specimens are concerned. They show some novelty and much excellent work, and form a very interesting and important group of objects. We commence with those who chiefly exhibit the cements properly so called, and the larger groups of objects, as applied rather to construction than decoration, and shall afterwards proceed to the plasters and scagliola.

a. Hydraulic Cements.

Messrs. ROBINS, ASPDIN, and CO. (Outside, West, 5, and Class XXVII., 103), are exhibitors of a gigantic slab of Portland cement, measuring 20 feet by 12, and 10 inches thick, weighing 15 tons; numerous blocks of cement and concrete, proved to various pressures, up to 15½ tons, showing the strength to be greater than that of Portland stone; of bricks cemented together and placed so as to give a pressure of 3 tons on the first brick; and of several other similar illustrations.

It has already been said that Portland cement is a hydraulic mortar, made of a mixture of chalk and a peculiar river silt. In working it is sometimes mixed with sand and even with broken brick, forming a kind of concrete of extraordinary strength. It receives its name from its peculiar colour, which approaches that of Portland stone, and not from being made from that stone, or in any way obtained from the Isle of Portland. Its hardness is very great, and it may be used with advantage, not only as a cement, but in many cases where ordinary stone is generally employed, and is even available for tanks and cisterns, being, when carefully manufactured, absolutely non-absorbent of water. The Jury have awarded a Prize Medal to these exhibitors, as showing specimens on a very large scale, admirably illustrating the use, the strength, and other capabilities of the material they manufacture. In addition to the illustrations afforded by specimens sent for exhibition, Messrs. Robins and Aspdin, as well as other exhibitors (Messrs. J. White and Co.), have tested the strength of their cements of different kinds, in the presence of some members of the Jury, and the results of these experiments will be included in an Appendix to this part of the Report.* They will be found

* See page 1295.

to contain facts and results of great scientific interest and practical importance. These exhibitors illustrate the use and comparative strength of several admixtures, consisting of different proportions of Portland cement with sand, broken brick, and other fragmentary substances, and the experiments sufficiently demonstrated the great strength of these valuable cements, and the different modifications of them.

Mr. J. SEELEY (Nave, West, 88, and Outside, West, 11) is the exhibitor of a large fountain, intended for a market-place, placed in a prominent place in the West Nave, and also of a figure of Mercury in the West Enclosure outside the Building. Both of these are of artificial stone, and although the former does not exhibit the material under very favourable circumstances, the Jury are satisfied that the general reputation of Mr. Seeley, and the uniform excellence of the material he manufactures, deserve to be rewarded with a Prize Medal.

It may be well to refer here to a great want manifest in this fountain, and in many other objects manufactured of artificial stone both by the present and other exhibitors; we mean the necessity of some adaptation, not merely to the purpose required, but also to the material to be employed, a necessity too often lost sight of by those who provide and execute designs.

Messrs. R and W. TEAGLE (Outside, West, 3) have sent a figure in Portland cement, exhibiting some merit in execution, and modelled from a figure of Lazarus in wood. It must be remarked, however, that there is a want of taste and consideration in thus copying in an imitation of stone, what was carved in and adapted for wood. The treatment and feeling of true works of art must and ought to take their tone from the material employed.

Mr. J. BOARD, of Bridgwater (by his agent Mr. Donohue), is the exhibitor of four figures in Portland cement, two of them outside the Building in the Western Enclosure (2), and the others in Class XXVII. (94). These figures belong to a numerous class intended for garden decoration, and are not unpleasing in themselves, although the colour and appearance of the material are not very satisfactory. We also have Mr. F. GREAVES (Class I. 99) exhibiting several figures and other objects in cement which offer little for observation.

Mr. FURSE (Outside, West, 19) has sent specimens of an artificial stone invented by him, and manufactured since 1838, adapted for flooring damp places and other purposes. This material is of rather dark colour and considerable hardness; it may be cast in slabs of considerable size (up to 8 feet by 5), and is applicable for cisterns and drains, both pipe-drains and invert for sewers of large dimensions. It has also been used for fortification-works, as a cement for bricks, for lining prisons, casements, &c., and for many minor uses. It is non-absorbent, and is said to stand exposure well. The price of this material in slabs is 6d. per square foot, up to 2 feet square, and for other works it is cheap in proportion. It was first invented in Hamburgh, and is said by the manufacturer to be used on the Continent in many extensive works for drainage and fortification. The Jury have adjudged this manufacture to be worthy of Honourable Mention.

Other exhibitors of cements more or less completely manufactured, but not strictly decorative, and not including coloured or scagliola work; are Mr. T. SMITH (Class I. 177), who shows two blocks of concrete manufactured of the Mountfild lime, Sussex, a material very well adapted for submarine work; and Messrs. GRIFFITHS

and STRONG, of Whitby (Class XXVII. 67), who also show cement stone and cement (Mulgrave's) in its application to building purposes for agricultural cottages. We may mention here, also, some blocks of Medina cement exhibited by Messrs. FRANCIS and SON, who having obtained a Medal for their Parian, will be more fully referred to when the scagliolas are described.

M. AGOMBART (France, 2) has received Honourable Mention from the Jury for the hydraulic cements which he exhibits, and of which he is the manufacturer. The hydraulic nature of the cement exhibited by M. Agombart is derived from the kind of puzzuolana which he uses, rather than from any natural qualities the stone possesses; but the Jury having the opportunity of seeing and comparing the various cements exhibited, find that this is somewhat light and porous. They understand that it is made of a limestone containing a certain proportion of silica.

Messrs. REGNY and Co. (France, 1427) have obtained Honourable Mention for an hydraulic lime by a mixture of burnt and unburnt stone, so that the result is another modification of puzzuolana. The method is ingenious, and the result is said to be satisfactory, but the Jury regret that in this and several other cases before them, it is quite impossible to come to any definite conclusion, as the test of experience is the only one that is of any value, and they have no means of judging beyond the mere examination of a material exposed to no test, and exhibited on a very small scale. This remark applies to the objects exhibited by M. De RUOLZ (France, 1466), which consist of a number of bottles filled with cement, and M. HEILGENTHAL (France, 259), who shows some very neatly finished objects in a hard mastic, beautifully and delicately constructed, and adapted for architectural decoration. Mr. EVROT is another French exhibitor (190), concerning whose performance the Jury have no remark to offer. Both these exhibitors are Honourably Mentioned.

From BELGIUM there are two exhibitors in cement, Mr. C. SOETENS (424), and Mr. N. FOLLET (426). Neither of them admit of any detailed notice.

From Central and Southern Europe there are a few cements, the most interesting of which is sent by A. CRISTOFOLI (Austria, 38), who is Honourably Mentioned for a collection of paving blocks and columns of some interest. Messrs. J. SPANNA and Co. (Sardinia, 88), also exhibit paving blocks of artificial marble, and have received the same notice. Both these exhibitors appear to be manufacturers of a material well adapted for the purposes for which it is intended, and no doubt of sufficiently moderate price when laid down in the country. The prices quoted to the Jury are not sufficiently different from those charged for similar results in England to require special remark on this score.

The GREEK GOVERNMENT are exhibitors of a very fine natural cement of the nature of puzzuolana, and consisting of volcanic earth from the Island of Santorin. This material is Honourably Mentioned by the Jury as of known and excellent quality, and capable of being supplied in unlimited quantities at a very moderate price.

There are several other foreign exhibitors of cement and similar compositions. Mr. E. SEEGER, of Esslingen (Wurtemberg, 78) has sent mosaic asphalte tablets constructed on a new plan; and Messrs. MOOSBRUGGER and KOBBE, of Coblenz (Prussia, 428), some table-slabs of artificial marble inlaid with mosaic work; neither of these call for extended notice. An hydraulic lime is exhibited by

Messrs. LEUBE BROTHERS, of Ulm (Wurtemberg, 5), which is described as a quickly-setting, hard, and valuable material, the price being 1s. 8d. English per cwt.

From Austria we have two exhibitors of artificial pumice-stone, viz., Messrs. B. HARDMUTH and Co. (35), and Mr. J. SCHABAS (36), and one who sends artificial stone and marble, Mr. R. ROHLIK (37). The artificial pumice is not without importance in the absence of an abundant and cheap supply of the natural stone, and is understood to be extensively used.

b. Plasters and Scagliola.

The general composition of the plasters has been already explained; but as the subject is one of importance and very general interest, we may here briefly recapitulate the more essential features of distinction between them and cements. The latter (cements), whether hydraulic or otherwise, easily part with the carbonic acid and water which the cement-stone contains by the mere application of heat, and become reduced to lime, whence, by certain treatment and some admixture, either natural or artificial, but generally by a mixture of silicate of alumina, a material results which more or less rapidly takes up the water required for effecting solidification, and immediately hardens without being affected by external circumstances. The basis of such cement is carbonate of lime. On the other hand, the plasters are composed of a basis of sulphate of lime or gypsum, which being burnt, parts only with its water of solidification without being in any way decomposed. The readmixture of water reproduces solidification, though in a somewhat altered form, but by adding some of the salts of alumina, borax, and potash in a certain stage of the process, it is found possible to increase the hardness and compactness of the newly-formed stone and modify very greatly its absorbing power. In these admixtures lie the secret and peculiarity of all the various patented plasters known as Parian, Keene's, Martin's, and others.

Messrs. J. B. WHITE and SONS (Class I. 130, and Outside, 10) are extensive exhibitors of Portland cement, but have added to them samples of various other cements and plasters, some plain, and others highly decorated. They may be considered as more especially the exhibitors of Portland and Keene's cement, having constructed a beam of bricks, in which the former is used, and the strength of which was tested in the presence of some members of the Jury. Besides these are several panels, chimney-pieces, floorings, and other decorative objects of the latter kind (Keene's). The details of the experiments above alluded to, and some others of the same kind by Messrs. Robins, Asplin, and Co., will be found in a subsequent page*, and it need only be said here, that the results were highly favourable to the use of Portland cement, showing it to be of great value for strength, as compared with Roman cement.

The decorative work of Messrs. White is particularly interesting, and is that to which we here chiefly refer. It includes one large panel and a pavement of Keene's cement (gypsum twice burnt and mixed and made up with alum), of extreme hardness, coloured with earthy and metallic oxides, and worked to a high polish. In this state the cement resembles scagliola, possessing even greater

* See page 1265.

brilliance and depth of colour, but wanting something of the hrocciated character which characterises that preparation. Another of the panels on the south wall is executed in French plaster, which being far more abundant and more easily quarried than the English, is much cheaper, but owing to an admixture of carbonate of lime it does not turn to so pure a white. The object of the exhibitors has been to show that this material is, notwithstanding, quite as well adapted for the finer kinds of work, as it is for stucco on walls and other common purposes.

A number of smaller objects are shown as illustrations of various decorative uses, but it must not be forgotten that the simple and less-noticed adaptations to skirtings and other parts of rooms where a very hard durable substance is required, uninjured by damp, and perfectly safe from the attacks of vermin, is a practical result much more important than any other. This is the true value of Keene's and other similar plasters obtained by the admixture of borax, alum, or some other salts of the alkaline earths, with the burnt gypsum in various degrees of purity. A Prize Medal has been awarded to the Messrs. White for their exhibition of Portland and Keene's cement.

Messrs. C. FRANCIS and SON, of Nine Elms (Class XXVII. 47), have constructed for the purposes of the Exhibition, a large and handsome screen of Parian cement, representing the various qualities of the material and the kind of decoration for which each different quality may be considered best adapted. This cement, like Keene's and Martin's, is very hard, and is valuable for many purposes of house decoration; it also admits of very rapid execution, one of the specimens exhibited having been painted on the same day that the cement was set. The material is very beautiful, so far as fineness of grain and perfect facility of receiving colour are concerned, and it receives a splendid polish, but the white, though pure, is dead and unpleasant in its tone.

The scagliola work in these specimens, executed by Mr. Vincent Bellman, is throughout excellent, the colours which are introduced by the scagliolist imitating verd antique, Sienna and other marbles, jasper, &c.

Besides Parian, Messrs. Francis and Sons exhibit specimens of Medina cement (a modification of Roman) made up with shingle, and producing a substance of great hardness and durability well adapted for garden pavement. The cost of this by the sea-side, where shingle can be readily had, would not exceed 6*d.* per foot, cube. A Prize Medal is awarded to these exhibitors for their different cements, which they manufacture extensively, and for which they have a high reputation.

Messrs. STEVENS and SON, of 186, Drury Lane (24), the patentees and manufacturers of *Martin's cement*, exhibit some excellent and highly-finished decorations of that material on the South Wall. Its peculiarity in relation to other gypsum cements has been already mentioned, and the advantage is considered to be great compactness and extreme hardness. The scagliola work executed upon it produces effects that are very beautiful, and the price is said to be moderate as compared with the other scagliola; but there can, of course, be little difference of cost where the composition is so nearly the same, as is the case with this and the other similar cements. The Jury have adjudged a Prize Medal to these exhibitors.

To Messrs. C. ILES and Co. (28), a Prize Medal has been given for an ingenious

and cheap imitation of marble in soft and hard cement, invented and manufactured by them. The effect is produced by the waste materials of silk works, or the short cuttings from piled fabrics, as cloth and velvet, mixed with the cement, the whole thus forming a mass having either a uniform colour or a mixture of colours throughout, while the veins are formed by silk threads drawn out to imitate such appearances as may be fancied. A great advantage in point of cheapness is thus obtained, and in some cases a polish can be produced during the laying on of the cement. The material seems adapted for halls, staircases, and other internal work in houses, churches, &c., and can be finished where polish is not required for 3*d.* per square foot in stucco, and 4*d.* in hard cement. For polished work 9*d.* extra would be charged; but when it is remembered that the price of scagliola of the plainest kind is 6*s.* 6*d.* per foot, the vast difference in cost will be appreciated, while the durability must be at least equal.

In true scagliola the ordinary colours introduced are apt to be affected by the moist state of the work and the use of alum, so that they often run; while on the other hand, from the nature of the material, consisting of a coat of plaster on a framework of some kind and afterwards polished, there is little means of adaptation to positions where strength is required. It is therefore that the Jury have thought it right to notice a Gothic arch of a new kind of scagliola, invented and exhibited by DENIS DOLAN, of Manchester (45), to whom they award a Prize Medal. This arch includes a clustered column with base and capital cast in one piece, the artisan preparing a mould and pouring into it the outer coat, a marble composition, which is allowed to set before the coarse cement of the interior is added, the latter being so contrived as not to interfere by its expansion with the outer coat, but rather insure the union of the two. This new process of casting scagliola work, and some contrivances in polishing, are noticed by the Jury as worthy of consideration. The cost of the articles in the Exhibition would be about 20*l.*

Messrs. ORSI and ARMANI (36) are the exhibitors of a material called metallic lava, which is a plaster capable of being worked into a variety of patterns and colours, as illustrated in the Exhibition, and well adapted by its beauty, durability, and cheapness, for floorings and other decorative purposes, amongst which is a table in the Moorish style, intended for the President of the French Republic.

Two different kinds of the metallic lava are exhibited: one of which is white and ornamental, and admits of the application of mosaic work; and the other brown, and peculiarly adapted for covering roofs and terraces, lining tanks, cisterns, fish-ponds, brick walls, stables, &c., where a durable, cheap, and impervious covering is required. Both kinds have stood the test of experience, and are known to be well adapted for the object they are intended for. The composition is patented, and the method of laying down a flooring or terrace without trace of joints is both new and advantageous, insuring the perfect impermeability of the whole to moisture. A Prize Medal is awarded to these exhibitors.

To Messrs. DELLA VALLE (Tuscany, 114) Brothers, of Leghorn, a Prize Medal has been awarded for a new and peculiar manufacture in scagliola, to a certain extent imitative of works in Florentine mosaic, but applied in cases which would be impossible by that process. The objects exhibited consist of two tables and a vase, all truly inlaid, and having a striking and very brilliant effect. This kind of

manufacture differs from ordinary scagliola in the much greater complication of the process, and also in the greater beauty of the result, as the subjects include figures and views which at first appear hardly possible to be executed in such material, but which show great labour and skill, and some artistic knowledge in application. One of the objects, a round table, contains a central tableau, surrounded by an azure zone, with several emblematic ornaments. The table itself is of scagliola on a base of marble, each colour composing the ground, and each figure of the central tableaux has been first inlaid in a single piece and then shaded. The lights also are all inlaid, and the general effect is extremely beautiful. It will be seen that the general principle involved is that of a mixture of fine inlaying with shading. It would appear, however, that the result, although beautiful, is almost too costly to be generally adopted, as the price of the round table referred to is stated at 250*l*. The rectangular table in imitation of *pietra dura*, and the vase, which is copied from the antique, show several difficulties incident to the process very successfully overcome. The polish in all the specimens is very good, and entirely natural, no varnish whatever being used.

Mr. L. ROMOLI (Class XXX., 351, and Tuscany, 118) exhibits a scagliola candelabrum in imitation of *giallo antico*, designed by L. Gruner, Esq., modelled by Ant. Trentanove, and the property of His Royal Highness Prince Albert; and also a table in inlaid scagliola, shown in Tuscany. This exhibitor is Honourably Mentioned as exhibiting excellent workmanship in the elegant and costly applications of the material he employs. The candelabrum is not altogether pleasing in its effect, but the workmanship is good. The inlaid table is something in the style of those exhibited by the Messrs. Della Valle, but not at all equal either in design or execution. It appears also to have been manufactured in a somewhat different manner. A cement mosaic, in imitation of wood and marble, was sent from the Cape of Good Hope for exhibition.

c. Artificial Stone with Silica Base.

As constructed in a manner and on principles altogether distinct from those of both lime and gypsum cements, we must next mention an artificial stone recently introduced by Messrs. RANSOME and PARSONS, of Ipswich, and somewhat extensively exhibited in Class XXVII. (97). This material is a compound consisting of grains of sand, pebbles, portions of limestone, marble or granite, clay, or indeed any other material, cemented together by a true glass obtained by dissolving flint in caustic alkali in a boiler at a high temperature, mixing up the materials with this solution into a paste of the consistence of putty, moulding this paste into any required form, and after slow air-drying, burning the articles thus manufactured in a kiln at a bright red heat maintained for some time. In the course of this process, the alkali combines with the free silica and forms a kind of glass, so that the materials become cemented together by a substance which does not admit of the smallest absorption of moisture, and is consequently absolutely unattackable by the frost. It also resists every other kind of atmospheric action and is extremely hard. It possesses besides, the great advantage of not contracting sensibly during the last process of baking.

It may be well to state briefly the details of manufacture in this case. The flints are used in the rough state in which they are found in the chalk, and of large size. They are suspended in wire baskets in a high-pressure boiler, the

pressure being from 60 to 100 lbs. on the square inch. For about a ton or ton and a-half of flints, about a quarter of a ton of caustic soda is required (about 56 per cent. of alkali). The resulting substance, a fluid silicate of soda, is drawn off every 48 or 56 hours, the quantity being about 200 gallons, and is afterwards evaporated down to a specific gravity of 1.165, when it is fit for use. The further process is sufficiently described above.

Although this kind of artificial stone appears to offer many advantages, it is right to mention one objection to its use which has not yet been obviated, consisting of an efflorescence of some of the salts of soda greatly disfiguring the appearance of the work.

Besides artificial stone adapted for all kinds of garden work, for paving, and for architectural decoration, it has been found easy to manufacture a porous variety for filter stones which may be made of any size, admirably answer the purposes for which they are intended, and are supplied at extremely small cost. They are cleaned with perfect ease, and may be contrived so as to be applied without a reservoir to filter water, delivered to houses by the system of constant supply. The cost of a filter passing 300 gallons per day would be 50s., and small filters are prepared for the use of travellers, the price of which is only 5s. Besides these slabs, permanent ascending filters are prepared with the same material, the price of which, complete, varies from 15s. to 4l., supplying daily from five to sixty gallons: these are especially adapted for ships and domestic purposes. Other very useful articles have been manufactured of the same kind of material, among which scythe-stones and other grindstones may be mentioned. The Jury have awarded a Prize Medal to these exhibitors for the improved material they have introduced, and the applications of it they have already made.

d. Bituminous Cements and Mastics.

Another and quite different kind of cement is made chiefly with bitumen. It is now well known both in England and on the Continent, under the name of asphalt.

The pavement laid down at the east entrance of the Exhibition by the SEYSSSEL ASPHALTE COMPANY is a good sample of their material, and a Prize Medal has been awarded them for this object. The asphalt is generally obtained from natural sources, where it is combined with a large percentage of carbonate of lime, reaching even to 80 per cent. or more, and the combination is so perfect that the rock in this state long resists the action of muriatic acid. Less pure kinds contain sand, which is found to be injurious. The best kinds of asphaltic rock are converted into a plastic workable mastic in a short time, and at very little cost, merely by the addition of 6 or 8 per cent. of mineral or coal-tar and a few pebbles, the union being effected in an iron caldron at a very moderate heat, and the viscid mass placed on a prepared flat surface. The advantages of this kind of pavement are its extreme toughness and power of resisting very considerable wear. Such a pavement absorbs no water and makes very little dust.

Mr. J. B. DEFOUR (France, 485) is also the exhibitor of an asphalt adapted for pavement of this kind, as well as of mosaic-work of natural stones cemented by asphalt. This use of the material is fully appreciated by the Jury, and must

be extremely valuable. It has, however, been long known, and indeed the application of bitumen dates very far back in the history of civilization, as we find that it was commonly employed by the ancient Egyptians, and formed a solid and durable cement in the walls of Babylon. The Jury award an Honourable Mention to Mr. Dufour for his exhibition.

e. Metallic Sponge Cement.

A very curious and ingenious contrivance for a pavement is exhibited by Mr. A. CHENOT (France, 119), which, if it can be manufactured at an economical rate, may be of importance under certain circumstances. It is called by the inventor "metallic sponge," and is prepared by reducing certain ores of iron (oxides) into a spongy state by the removal of their oxygen gas. In this condition they readily form into a durable cement. It may be a question whether an invention of this kind, which is not very recent, would not have been brought into active operation before now, had there been no practical difficulties hitherto insuperable; the Jury feel, however, that they are justified in conferring a Prize Medal on Mr. CHENOT, in the belief that a new principle has been introduced, and that a most durable material for pavements, &c., is provided by the aid of his contrivance.

K. GLASS AND PORCELAIN MOSAICS.

The art of inlaying, when the material inlaid consists of manufactured cement, glass, or porcelain, instead of marble or gems cut into definite forms, is so extremely different in all respects, that we have judged it best to describe the processes of the former kind separately, and bring together the exhibitors who have sent such results into a single group. Even this group admits of subdivision, as it includes Roman mosaics, where prisms or threads of glass of various size and shape compose the whole picture; Venetian mosaics, where the glass is a tessera or other squared shape of some size, inlaid often in a cement base; and a third kind in which the inlaid substance consists of porcelain or burnt clay, generally also in tesserae, and producing results admirably adapted for paving, and for house, palatial, and church decoration.

a. Roman and Venetian Mosaic.

The manufacture of true Roman mosaic has always, we believe, been confined to the city whence its name is taken, and no country has entered into competition with Rome in exhibiting specimens of it. The Reporter has received the following account of the manufacture from M. Pistrucci, Chairman of the Jury:—

"The mosaics which are made in these times are composed of pieces of glass, sometimes called *smalt* and sometimes *paste*. They are made of all kinds of colours, and every different hue, and for large pictures they take the form of small cakes. For small works they are produced in threads, varying in thickness from that of a piece of string to the finest cotton thread. Heaps of these, of all tints and colours, are prepared. A plate or slab of copper, marble, or slate is then provided, of the size and thickness required for the intended work. This slab is hollowed out so as to resemble the bottom of a box or a tray, to a

depth proportioned to the work ; this may vary from an inch to the eighth, or even the sixteenth of an inch if the work is to be small. This hollow is then filled with plaster of Paris, well smoothed, on which the outline of the proposed design is very accurately traced, and an inked pen is passed over the outline to preserve it. Very few tools are required by the workmen ; but for the large works, where comparatively large pieces are to be inserted, small sharp-cutting hammers are made use of for splitting the cakes and reducing them to their proper size and form. Pincers also, of different forms, are used for placing them equally. In very small works, instead of hammers, sharp-pointed pincers are made use of, like those with which diamonds are taken up, and sometimes a small tool like *scarpello*. The heat of an oil lamp is required to enable the workman to draw out the strips of glass to the fineness he wants, even to that of a hair. When this is all ready, the first operation is to dig or scoop out, with a *scarpello* of the proper size, a small piece of plaster of Paris from the bottom of the box or tray without injuring the outline. This is filled up with a kind of mastic, like that which is used to fix panes of glass in the sashes or frames of a window, and the required piece of smalt or glass is then pressed into the mastic or composition. In this way, step by step, and from day to day, repeating the operation of scooping out a small piece of plaster of Paris, and never losing sight of the outlines, they gradually fill up the whole tray. In works of considerable dimensions the workmen place the tray or plate before them as painters place the canvas on which they are painting, and have the original always close to them. For smaller works they sit at a table as if writing, and generally keep their work flat on the table. The designs used in these mosaics are, for the most part, copied from the pictures of some artist of eminence, the designers themselves being also a separate body, working for the *mosaicisti*, who mechanically fill up the spaces as above described. It is true, however, that though these last cannot be called artists, nevertheless those who distinguish themselves in the art must be endowed with a good natural taste, a true and correct eye, and great perseverance, to enable them to copy the various tints and forms of the original without injuring the outline. I am not aware that any *mosaiciste* has ever worked from his own original design, or even that he has drawn the outline on which he works. When this operation is completed, it is passed over a stone made perfectly smooth and cleansed of every kind of dirt. But as it will always happen that interstices, however minute, will be left more or less between the several small pieces of smalt inserted in the mastic, these are to be carefully filled up with heated wax, applied with hot iron instruments from a pallet on which it has been prepared for the purpose ; and much of the good effect and finish of the work will depend on the ability and care of the workmen by whom this operation is performed."

The exhibitors of works of Roman mosaic are six in number, and the Council of Chaireu have acceded to the recommendation of the Jury of this Class to give a Council Medal to that one amongst them who has sent the most remarkable specimen of this most beautiful and imperishable art. The artist selected for this high reward is the Cavaliere BARBERI (Rome, 15), and the object he exhibits is a large round table, designed and executed by him, or under his superintendence, and representing celebrated views in Italy. Without comparing this with other

celebrated mosaics, not exhibited, the Jury have been exceedingly struck with the singular delicacy and beauty of the workmanship, the admirable adaptability of the material to the nature of the work and the style of design, the exquisite shading of the colours, and the brilliant though softened effect of the group of views, the atmosphere and sky of each mingling into the same ethereal tint, which relieves the eye, and allows it to rest with pleasure on the separate views.

Of the other mosaics, two of very different kind have been sent from the ROYAL MANUFACTORY AT ST. PETER'S (Rome, 23), one of them being a copy of a celebrated picture by Guercino (a St. John Baptist), and the other a medallion, the portrait of Pope Boniface the Second. Both of these are of much larger pieces than the table, being intended for more distant vision, the latter especially, which appears meant for a lofty position in a church, but both are remarkably fine specimens of workmanship, and the colours and drawing are perfect. A Prize Medal is awarded to the exhibitor of these objects. (Prize Medal granted by Class XXX. also.)

To the Cavaliere LUIGI MOGLIA (Rome, 20) a Prize Medal is also adjudged, for a circular table, a square slab, and a picture presenting a view of Paestum, all in Roman mosaic, and all admirably executed. The other exhibitors of similar objects, viz., BENEDETTO BOSCHETTI (Rome, 17), artist; DOMENICO MOGLIA (Rome, 21), and ANTONIO ROCCHIGLIANNI (Rome, 22), are Honourably Mentioned, as having shown admirable specimens of the same curious art; and to the former a Prize Medal has been awarded.

It is right to mention that since the opening of the Exhibition, and indeed since the investigations of the Jury have been completed, several objects in Roman mosaic have been added, which are chiefly of small size, but which deserve high commendation for their beauty. Several members of the Jury having left town, it has been impossible to reward in any formal manner the exhibitors of these, although they well deserve to be mentioned with the others.

A group of objects is exhibited in a new kind of glass mosaic, by Mr. G. H. STEVENS (Class XXX., 158), executed at about one-third the price of the ancient manufacture of this kind. These objects include a pair of spiral candelabra, made in Keene's cement, in imitation of marble, inlaid with various patterns of glass mosaic, and intended for the decoration of a hall or drawing-room. The glass is in large tesserae. There are also glass mosaic tables, a slab containing various patterns for panels, and a specimen of heraldic decoration. The glass is stained or gilt, and the method is adapted for many purposes. The Jury have thought the method worthy of Honourable Mention.

b. Clay and Porcelain Mosaics.

No exhibitors can at all compete with the Messrs. MINTON for the variety, beauty, and excellence of the encaustic and mosaic tiles manufactured by them by a process which involves very great mechanical ingenuity, and which has been carried to a very high pitch of perfection. Messrs. Minton have, indeed, to some extent, followed in the track of similar manufactures among the ancients, both with regard to the uses, forms, and patterns of their tiles, for paving and walls; but they have very greatly improved all the mechanical contrivances, introducing one method more especially—enormous compression to consolidate dry clay—

which deserves very distinguished notice, and has been the commencement of an entirely new era in mosaic work in plastic material. To Messrs. Minton, accordingly, the Jury recommended a Council Medal, and the award was recognised by the assembled group of Juries, and sent to the Council of Chairmen for confirmation. These exhibitors had also received the same honour for their manufactures in porcelain generally, and there is thus a joint Council Medal given from Classes XXV. and XXVII.

The tiles exhibited by Messrs. Minton are of three kinds, viz. :—

1. *Encaustic, or Inlaid Tiles.*—These are made by pressing clay in the plastic state into an embossed plaster mould, the pattern or design on the mould being raised. When the tile is withdrawn from the mould, the outline of the pattern is indented; and the indented parts are then filled in with liquid coloured clays according to the colours it is wished to produce. The surface is then scraped quite flat, until the pattern appears well defined. The tile is then fired, which brings out the colours to the proper tint.

2. *Venetian Tiles and Mosaics.*—These tiles are produced by the compression of powdered clays in metal dies, of any geometrical form that may be desired; the clays having been previously stained with metallic colours. Each tile or tessera is, of course, of the same colour throughout. When fired, they are arranged on a smooth flat platform with the face downwards, according to the design intended; after which liquid Roman or Portland cement is poured upon them, and they are thus formed into slabs of any size required.

3. *Tiles made after the manner of the Alhambra and other Spanish Tiles.*—There is only one example of these tiles in England, and that is in the Mayor's Chapel at Bristol, supposed to have been presented to a predecessor in the civic chair by a Spanish merchant. These are made by pressing plastic clays on an embossed mould, which forms grooves or indentations. These tiles are then fired, and come out of the oven with the pattern formed. The indentations are then filled in with enamels of various colours, and fired again, which produces a brilliant effect, and renders the tiles suitable either for floors or casing walls.

To Messrs. ALFRED SINGER and Co., of the Vauxhall Pottery (88), a Prize Medal has been awarded for a mosaic pavement composed of tesserae of vitrified clay of several colours and shapes, all produced by machinery with great rapidity and facility, and without the necessity of chipping any of the tesserae. The machine is patented by the exhibitors, and besides making tesserae of usual form and size, is capable of subdividing them in such a way that with comparatively few shapes an endless variety of patterns can be executed, the joints being preserved in straight lines throughout the whole pavement.

The mode of working is as follows :—The clay being prepared in the usual way by washing and sifting, and stained with various metallic oxides, is formed by a machine into long thin ribands, about $\frac{1}{2}$ inch thick, and 3 or 4 feet long. Out of these ribands the tesserae are cut by the patented machine with great rapidity, and when dry are baked in saggars in the usual way.

The pavement slabs are made by laying these tesserae face downwards on a perfectly flat slate, the pattern being of course reversed, and covering their backs with a layer of Portland cement and two layers of rough thin tiles, carefully embedded in the cement. In this way strong slabs are formed, of about 1½ or 2 inches thick.

which are almost perfectly impervious to moisture or rising damp, and can be laid down by any mason.

The exhibitors consider that they may fairly claim merit for the introduction of the method, and the flatness and durability of the surface, as well as its impermeability. The work can be produced at from 2*s.* 6*d.* to 5*s.* per square foot, according to the size of the pavement and that of the tesserae. The specimen in the Exhibition is valued at 3*s.* 6*d.* per square foot.

Messrs. MARCHESI and OSSOLI (Rome, 13) are exhibitors of a number of slabs of cement of very good quality prepared for pavement, and imitative of marble mosaic. They have received Honourable Mention for these objects.

Group 4.—MANUFACTURES IN CLAY.

The number of objects exhibited belonging to this group is considerable, and of great importance. The number of exhibitors is not, however, very large, amounting only to between eighty and ninety, of whom nearly forty are foreigners.

Of the English exhibitors there are some remarkable for excellence of various kinds, but especially in fire-clay goods, terra cotta, salt-glazed ware, tiles, drainage pipes and bricks. Of each of these there are several.

France has as many as twelve exhibitors sending terra cottas of great beauty, and some fire-clay goods.

Belgium has only four, and all of fire-clay goods, consisting of retorts and crucibles. Of the various States of the Zollverein there are four from Saxony, and one from Bavaria, almost all of chemical apparatus; besides four from other countries of brick and terra cotta. Austria has only one, but a very important exhibitor in bricks. Italy has also only one, who sends a clay mosaic pavement. From the Peninsula there are four; two of them sending samples of the large jars for which Spain and Portugal have long been famous. From India are several specimens of bricks and terra cotta; and from the United States are a few objects of some interest.

L. BRICKS AND TILES.

Among the materials used for construction none are more really important than bricks, these articles being manufactured of a substance almost universally attainable, worked into a form convenient for use, hardened and rendered more or less impervious to moisture by a partial burning, and when used, cemented together with mortar, or some of those substances described in the first group of plastic materials. Bricks have been employed from the earliest period, and are still as necessary, if not more so, than ever; and whether in the form of common stock bricks, or any modification for building purposes, or as flat or other bricks for roofing or paving, or lastly, as gutters or pipes for drainage, the number used is so large, and the interest concerned so universal, that even the smallest improvement, either in the mixture of material, the method of burning, the method of uniting, or indeed any other matter, is of really national importance.

The facts with regard to bricks have reference to the kind of clay used; the admixture of clay with other material; the size, shape, and proportions of the brick, tile, or pipe; the mode and extent of burning; the production of any glaze

or other peculiar surface ; and lastly, the mode of using them and attaching them together. It will be found that several contrivances, more or less ingenious, and more or less complete and efficacious, have been submitted for exhibition, and have come under the consideration of the Jury, and the Reporter regrets that this subject, the interest and extent of which he fully recognises, should have been left to him to describe and dilate upon, sensible as he is that the want of professional and practical acquaintance with the arts of construction must seriously interfere with the due execution of his task.

In speaking of the exhibitors of these articles, it will be convenient to consider them grouped as far as possible in regular order. We propose to treat them as follows, although it may sometimes be necessary to depart from this plan on account of single exhibitors sending objects of different kinds.

1. General improvements in building contrivances, such as hollow bricks, glazed bricks, &c.
2. New and peculiar forms of bricks and ornamental bricks.
3. Common, waterproof, and white bricks.
4. Roofing and paving tiles.
5. Drain-pipes, &c.
6. Bath or scouring bricks.

We have mentioned in the commencement of this Report that a Conneil Medal had been awarded to the SOCIETY FOR IMPROVING THE CONDITION OF THE LABOURING CLASSES, for their improvements in the arts of construction as applied to dwelling-houses, and especially to those of the lower classes. Those only who have visited the dwellings of the labouring population, as at present constructed in large towns, are at all aware of the overwhelming necessity for some great and rapid improvement, and of the vast alteration that might be effected in the moral condition as well as the health of the poor, if the decencies of life were attended to in their habitations. By introducing a system of construction remarkable at once for strength, cleanliness, warmth, ventilation, dryness, rapidity of completion, safety from fire, and economy, this Society have established claims deserving of the highest acknowledgment, and have insured the gratitude of multitudes who have not yet learned the advantages they will derive. The contrivances include a peculiar form of brick, made tubular ; moulded articles in clay for window sills, mullions, &c., soil and other drains, earthenware water-closets, &c., besides kitchen-ranges, iron bedsteads, &c., which do not come under the consideration of the Jury. Many of these are illustrated, not only in the Exhibition (Class XXVII., 124), but in the lodging-houses constructed by H.R.H. the Prince Albert, opposite the Exhibition Building in Hyde Park ; but it is well to state that the cost of these cottages need not by any means be taken as a model for similar constructions elsewhere, and that, on the contrary, the houses that have been actually erected show a sufficient return for the capital invested, and even at very moderate rents promise to prove profitable in a strictly commercial sense.

Of all these contrivances the Society appear to put forward the principle of tubular bricks as of first importance. It is true that the idea is by no means modern, similar materials having been employed by the Romans when lightness was needed, as in large vaultings, and being described as of common use at this

day in Tunis, and other parts of North Africa, where they have indeed been employed for many ages. Bricks of this kind, of somewhat peculiar construction, have been patented by H. Roberts, Esq., F.S.A., the Honorary Architect of the Society, and have been illustrated by the Society in the Exhibition, the one kind made wedge-shaped (the value of which form is doubtful), and bonded longitudinally over each other, so that two cavities run parallel through every course, giving a double security against moisture, and much facility for ventilation. We quote the following from a paper published by the Society, and distributed by them :—

The dimensions being unlimited, a size has been chosen which, with the omission of the headers, reduces, by about one-third, the number of joints, and greatly improves the appearance of the work, giving it more boldness of effect and resemblance to stone than that of ordinary brickwork. This size is twelve inches long, and three courses rise one foot in height ; a size equally convenient for the workmen in the manufacture, and in the use of the bricks, for whilst less liable to damage in moving than those of larger size, their form admits of ready handling and stowage for transport.

Nine patent hollow bricks of the size before described will do as much walling as sixteen of the common sort, whilst the weight of the former but little exceeds that of the latter, an important consideration in reference to carriage as well as the labour in using.

When passing through the machine, or in the process of drying, any number may be readily splayed at the ends for gables, or marked for closures, and broken off as required in use ; or they may be perforated for the purpose of ventilation. If nicked with a sharp-pointed hammer, they will break off at any desired line ; and the angles may be taken off with a trowel as readily as those of the common make.

A sufficient proportion of good facing bricks may be selected from an ordinary burning, and in laying them, a much better bond will be obtained than is usually given in common brickwork.

The bricks for the quoins and jambs may be made either solid or perforated ; and with perpendicular holes, either circular, square, or octagonal :—those in the quoins may be so arranged as to serve for ventilating shafts. Stoue will be found equally applicable for the quoins and jambs, and the appearance of the work be thereby improved.

Hollow bricks may be made with any good tile machine, in the same manner as ordinary draining pipes, and at about the same cost, in proportion to the quantity of clay contained in them. They are more compressed, require less drying, and with much less fuel are better burned than ordinary bricks, even when only waste heat, or that in the upper part of the kiln, is used.

The saving in brickwork effected by the use of the patent bricks, when made at a fair price, will be from 25 to 30 per cent. on their cost, with a reduction of 25 per cent. on the quantity of mortar, and a similar saving on the labour, when done by accustomed workmen. The process of drying is much more rapid than in common brickwork, and the smoothness of the internal surface of walls built with the patent bonded bricks renders plastering, in many instances, quite unnecessary, whereby a further saving is effected, not only in the first cost, but also

in the subsequent maintenance. If glazed on the outer face, as may be done with many clays, a superior finished surface is obtainable without plaster.

STATEMENT, showing the Comparative Cost in a Rod of Reduced Brickwork, built with ordinary Bricks of the common size, and a Rod built with Patent Bonded Hollow Bricks.

	£.	s.	d.		£.	s.	d.		£.	s.	d.	
4,300 ordinary bricks to a rod, at 20s.	4	6	0	at 24s.	5	3	3	at 28s.	6	0	5	
2,450 Patent Bonded H. Bricks, " 25s.	3	1	3	" 30s.	3	13	6	" 35s.	4	5	9	
Saving in bricks per rod	-	£1	4	9		£1	9	9		£1	14	8

This shows an advantage of 29 per cent. in favour of the patent bonded hollow bricks, in addition to a considerable diminution in the cost of cartage or transport, and of 25 per cent. on the mortar and the labour.

The relative prices given above may be taken as the fair average selling prices, depending on the cost of fuel, labour in preparing the clay, &c., and the result of inquiries of parties who have made these bricks in Huntingdonshire, Wiltshire, and Lancashire fully confirms the statement that 30s. per 1,000 may be considered as a fair average selling price. Owing to their larger dimensions, this corresponds to 16s. 10½d. for the common sort, or if sold at 32s. this is equivalent to common bricks at 18s. The extra cost for glaze is not stated.

In concluding this notice of the contrivance here referred to, the Jury are desirous to place it distinctly on record, that the Council Medal is awarded to the Society for their exhibition generally, as exemplifying their efforts in various ways to improve the dwellings of the labouring classes, and not for any particular part of it.

A very ingenious machine, exhibited by Messrs. BORIE BROTHERS (France, 417) is well adapted for the manufacture of tubular bricks of the best quality, with considerable rapidity, and of perfectly uniform dimensions. In this machine the clay is greatly compressed, and when burnt, the bricks are extremely hard and strong. It is said to be capable of making 4,000 of ordinary size per day, but the size exhibited is very large, and there are as many as nine small tubes running longitudinally through each. The bricks can thus be made extremely light, the saving in weight being estimated at 50 per cent., but capable of reaching 70, while the saving in expense is stated at from 10 to 30 per cent. A Prize Medal is awarded to the exhibitor.

Other hollow bricks, manufactured in the ordinary way, and without statement of price, are exhibited by the North Devon Pottery (Class I. 127), but these do not offer any marked peculiarity.

Bricks of rhomboidal form are exhibited by Mr. J. C. HADDAN (Class XXVII., 114), and have been considered by the Jury as worthy of Honourable Mention. They are considered to offer a means of producing a better bond than can be obtained with the ordinary shape, but it will doubtless be very long before the form and proportions, which have so long been used in the manufacture of bricks, will be changed, or in any way modified for ordinary purposes. It may, however, happen that for special purposes a change will become advisable, and any ingenious attempt which possesses the great qualifications of cheapness and comparative simplicity is worthy of notice.

Other bricks of new form are shown by Mr. A. MILCH (Prussia, 9), who is considered worthy of Honourable Mention, and by Mr. R. BESWICK (Class XXVII. 106).

Moulded bricks are exhibited by Mr. L. TOMPSON (Class XXVII., 100) and Mr. E. S. KEY (Class XXVII. 126). The latter are adapted for window frames of cottages, school-rooms, &c., not being liable to decay, and being perfectly fire-proof. They are also cheap, the cost per foot super. being stated at 1s. for red and 1s. 4d. for white brick, including whole panes of sheet glass, but exclusive of carriage.

A number of specimens of ornamental bricks are exhibited from England, some of them worthy of special notice. Among these Lord LOVELACE is Honourably Mentioned for a stack of three chimneys, constructed for and exhibited by him (87). The form and style of these chimneys are better than the execution.

Mr. J. LUFF (111) has received Honourable Mention for moulded bricks, both plain and ornamental, besides red and white paving tiles, and kiln tiles for malting. The ornamental bricks are described as very economical, the number required for a chimney 10 feet high from the base costing not more than 30s., made to any pattern. The plain tiles and pantiles are capable of resisting weather, and form a cheap and durable covering for cottages. The collection exhibited is small, but very creditable.

Mr. J. AMBROSE (128) is the exhibitor of a white ornamental chimney, also adjudged worthy of Honourable Mention. The form and construction of the bricks employed are very creditable to the exhibitor.

We come now to the consideration of good common bricks, and the Jury have to mention as occupying the first place amongst these the series exhibited by Mr. MIESBACH (Austria, 610), of Vienna, the founder and proprietor of one of the largest and most remarkable establishments for brick-making that exists in the whole world. A Prize Medal is awarded to this exhibitor.

As some illustration of the magnitude of this establishment and the good quality of the bricks, we may state that it formed a part of the contract for the great tunnel through the Sömmerring, on the Austrian railway, that 20,000,000 of bricks required this year (1851) should be supplied from Mr. Miesbach's works, and that another contract for 40,000,000 for public works at Vienna is also supplied from the same works during the same year. These are all additions to the ordinary make, and the fact is certified by a member of the Jury, an architect of Vienna. The following statement (p. 1280) of the nature of their establishment has been forwarded by the exhibitors to the Jury, and is given here as interesting and instructive.

The privileged brick and tile factory on the Wiener-Berg stands on a space of ground of 26½ English acres, while an area of 680 English acres afford a supply of excellent material for brick-making, sufficient for several centuries to come, and consist of four sections, which are separated into ten subdivisions. There are 24,930 feet in length of drying sheds for the manufacture of ordinary bricks, and 8,304 feet of moulding sheds for the manufacture of tiles, and facing and ornamental bricks, besides 43 kilns calculated to burn 45,000 to 110,000 bricks per kiln, or to burn at one time 3,500,000. There are further in this establishment, infant schools for 120 children, a hospital with 52 beds, besides a tool workshop, a wheelwright's

NAME OF THE WORKS.	Number of Moulding Benches.	Annual Production of Bricks and Tiles.	Persons employed.			Total Number of Persons.
			Officials.	Overseers and Superintendents.	Workmen and Carriers.	
<i>In the Province of Austria below the Enns.</i>						
1. Inzersdorf on the Wiener-Berg (the largest) Brick Manufactory in the World - - -	446	65,500,000	13	19	2,620	2,890
2. Ober Laa on the Laaer-Berg - - -	61	8 500,000	2	3	310	495
3. Bielermansdorf - - - - -	36	4,000,000	2	2	150	180
4. Vösendorf - - - - -	40	5,000,000	2	2	180	220
5. Guntramsdorf - - - - -	60	8 000,000	2	3	270	315
6. Zillingdorf near Wiener-Neustadt - -	6	900,000	1	1	30	40
Total - - -	649	91,900,000	22	30	3,560	4,140
<i>Hungary.</i>						
7. Rakos near Pesth - - - - -	115	15,250,000	5	6	600	740
Together - -	764	107,150,000	27	36	4,160	4,880

and carpenter's shop, and the great watering and kneading pits for red and white ornamental bricks. On all the sections there are the requisite dwellings for the officials and workmen, besides stabling for about 300 horses. The six other factories are provided in the same proportion, and the amount of money turned over in the business amounts to about 1,800,000 florins c. m. (180,000*l.* sterling), the capital employed being 600,000 florins c. m. (60,000*l.*)

The ordinary dimensions of the bricks constructed by these exhibitors are double the usual size, measuring 11·3 by 5·9 and 2·8 inches, instead of 9 inches by 4½ and 2½, and they are said to be generally cheaper than stock bricks of the best quality in other countries, notwithstanding the high cost of fuel. They are burnt partly with coal and partly with lignite, obtained from numerous and extensive mines in various districts belonging to the same proprietors.

There are one or two exhibitors of improved common bricks, and some others who have sent similar articles chiefly as illustrations of raw material. Of these we only mention (as being exhibited in Class XXVII.) Messrs. FORDHAM and SONS (118), and Mr. F. FISHER (119), the former of whom send improved, and the latter white bricks.

Excellent bricks of the common kind used in the country are amongst the objects exhibited from India, but they offer nothing peculiar that requires notice here.

A Prize Medal has been awarded to Mr. J. WORKMAN (116) for an ingenious and apparently effectual method of rendering common bricks perfectly waterproof, at a cost of about 6*s.* per thousand. The machine by which the process is effected is sufficient to turn out from 30,000 to 50,000 per day, and the waterproofing takes place either during the first process of manufacture, or after the brick is completed. No extra cost of carriage is needed to complete the work under any circumstances. It is unnecessary to point out all the advantages that would result from taking advantage of this method, but the Reporter would not omit to notice its peculiar importance in the case of cottages and small houses,

and for vaults and foundations. It is in these applications that the very great absorbency of common bricks (which will take up on an average nearly a quart of water each) is so ruinous not only to the property exposed under their shelter, but to the health of the inhabitants, who are often very ill supplied with means of removing the evil. The inventor believes that the total extra cost of using his bricks would not exceed $\frac{1}{4}$ l. in the construction of a small cottage.

The manufacture of paving tiles, roofing tiles, and draining tiles, including also drain pipes and pantiles, is so far distinct from that of bricks in the ordinary acceptation of the term, that they admit of separate reference in this place, and many of them are more properly considered amongst agricultural implements. We have, however, a few remarks to offer concerning some of the various exhibitors who have sent articles of this kind.

To Mr. THOMAS PEAKE, of Tunstall, Staffordshire (123), a Prize Medal is awarded for a large and interesting series of articles manufactured in a peculiar preparation of clay, and with a peculiar burning, and called by him *Terro-metallic*. To produce this material several clays are mixed, and some of them being hard they are pulverised by rollers, and tempered in improved pug-mills, the whole being worked by no less than five steam-engines (one of them 50-horse power), and machinery of various kinds in several large factories. At the present time about 30 ovens are employed, and as much as 50 acres of land are in connection with the tileries. The establishment of this exhibitor is of very long standing in Staffordshire, and the prices at which the goods are supplied have been of late years very much reduced. The colour as well as quality of the *terro-metallic* is extremely good for many purposes, some of it being almost like cast-iron, and very strong testimonials have been given by many practical men in favour of the excellence and durability of the manufactured articles. It is stated that the heat at which the material is fired is so considerable as to insure in every case perfect hardness and soundness, and it also produces a natural glaze of considerable value.

Messrs. H. and R. HAYWOOD, of the Brownhills Tileries, near Burslem, in Staffordshire (127), are exhibitors of tiles of all kinds, quarries, stoneware pipes, closet-pans, traps, and other objects of very fine quality, and are considered worthy of a Prize Medal. Messrs. Haywood not only exhibit a very extensive series of these articles, which are largely supplied and much esteemed in the trade, but they have also added chimney-shafts and pavements of the same material. Their clay is of excellent quality, and very well and perfectly worked, and the firing seems to have been effected at a high temperature.

To Mr. ROBERT BROWN, of Surbiton Hill, Surrey (117), a Prize Medal is awarded for improved Italian tiles, and grooved ridge tiles, invented and exhibited by him.

Until this exhibitor introduced his modification of Italian tiles, those made in England, as well as those brought from the Continent, were ill adapted to the English climate, and therefore little used, but by the alteration he made in the form, the exact appearance of the Italian tile is preserved, while the roof is perfectly water-tight. The lower tile being slightly curved, and a horizontal indentation made across its face, about one inch from the top, besides a button being placed instead of the nail-holes used in the old Italian tile, the needful alterations are made, and the tile is complete. The tiles are coloured grey, the

colour being burnt in. The cost of these tiles is more moderate than that of any other Italian tiles used in England.

The grooved ridge tile is so contrived that the vertical ornaments can be made separately, at low cost, and with great accuracy, and can be replaced if broken. The Jury consider both this and the former modification as of great merit, and have reason to believe that they are fully sanctioned by experience under various circumstances of exposure.

A Prize Medal has been awarded to Mr. AMULLER (France, 405) for a new kind of tile introduced by him, exhibiting much ingenuity of design, besides great neatness and excellence of execution. Mr. FOX (France, 1232) is adjudged worthy of Honourable Mention for other tiles, of brick, clay, and glass, exhibited by him. The tiles of the former exhibitor are apparently well adapted for general use, unless their cost should be more considerable than that of the more common kinds, and nearly equal to them in decoration and durability.

Mr. SEALY, of Bridgwater (130), an exhibitor of roofing-tiles and Bath bricks, is Honourably Mentioned, chiefly for the latter articles. The scouring bricks, so called, were first brought into general notice by the house which he now represents, and he is still the principal manufacturer and exporter of the article, which is of great use for various purposes in the arts. The following account of the Bath bricks will be found to possess some interest, and is supplied by this exhibitor. It is probable that the finest silicious particles are derived from the destruction of infusorial animalcules at the meeting of the tide with the fresh water of the river, and it is not unlikely that a somewhat similar if not identical product might be obtained from the mud accumulating at the mouth of the Elbe, and other rivers, where such causes are known to act :—

“The material used for cleaning and polishing metal goods, &c., known by the name of *Bath brick*, is manufactured at Bridgwater from the tidal deposit of the river Parret; and although many attempts have been made to produce a similar article, we believe they have all hitherto failed. This material is a peculiar mixture of fine silicious sand and clay brought up by the tide, which is very strong in the Parret, and is deposited on the sides of the river's banks as the water becomes still, just before the time of its ebbing, and some little time afterwards.”

There are several exhibitors of draining-pipes and tiles, some of whom, sending also terra cotta and glazed stoneware, will be referred to afterwards in this Report; others, sending them rather as illustrations of machines than manufactures, do not properly enter into competition, and others again, already noticed, have been more remarkable for other more prominent, although perhaps not more really important, objects. We must, however, refer here to one exhibitor who has been adjudged worthy of Honourable Mention by the Jury, and whose products are extremely remarkable for the unusual beauty and purity of the material of which the pipes and tiles are manufactured. We allude to the Earl of ENNISKILLEN (Class I. 116, and IX. 232), and quote the following account of the Florence Court Tile and Pottery Works as forwarded to the Reporter :—

“The raw material, of which these objects are manufactured, consists of a patch of about 20 Irish acres, and is only a portion of a very extensive seam of clay, bounded on three sides by a very large extent of excellent peat, or turf bog, pro-

ducing an incalculable supply of fuel to the works at a cheap rate. The depths of the clay bed averages about 13 feet, of which the upper strata burning *red* measures about four feet, and is workable to within a few inches of the surface, the other nine feet improves in pureness, and burns whiter as it reaches the bottom.

"The qualities of this clay were partly discovered in 1847, and the manufacture of tiles commenced in 1848. In 1850 it was found necessary to increase the works, and erect two new kilns on a larger scale, to enable the manager to turn out a fresh weekly supply of pipes.

"The drying shed is 180 feet long, by 20 wide in the clear, and capable of containing in its drying compartments 50,000 two-inch pipes, with two wooden tramways running the whole length to accommodate the machines to the shelves, with a wide crossing in centre, close to the rear of which the pugmill, worked by two horses, is situated. Another range of drying sheds is now being laid out for erection, and the demand from this manufactory extends from Cork to Belfast. A pottery on a moderate scale has been established here a few months, and promises fairly for flower-pots, milk-pans, butter-crocks, jars, black and brown tea-pots, &c."

It may be well to observe, that there is no other fuel than peat used in any portion of this manufactory.

Mr. C. PHILLIPS, of Weston-super-Mare (Outside, West, 63), has sent for exhibition a collection of flower-pots, of very admirable manufacture, and remarkable both for colour, smoothness, and style. The Jury have considered Mr. Phillips worthy of Honourable Mention for these articles.

M. TERRA-COTTAS.

The manufacture of terra-cotta is an important and interesting modification of common moulded brickwork, requiring a clay of great purity, resembling that used for pipe-making and potter's-ware, containing but little iron, and made up with a quantity of crushed pottery and calcined flints, the whole being well mixed and burnt to a very high heat. It thus approaches in its nature to what is called stoneware, but the fusion of the materials is not effected. There are several exhibitors of terra-cotta of very high merit, and we proceed to enumerate them. It should be observed that the true terra-cotta of the ancients was a less baked and much less durable material than the modern kind, being, in fact, little more than sun-baked clay of considerable purity.

Of English exhibitors of terra-cotta, the most remarkable in respect to the magnitude of the objects exhibited are Messrs. E. P. WILLOCK and Co, of the Ladyshore Terra-cotta Works, Manchester (8, and Nave, West, 223), to whom a Prize Medal has been awarded. A complete model of a decorated Gothic church, executed entirely in Ladyshore terra-cotta (the whole of the church as well as the model being of this material), forms one very interesting and prominent portion of the Exhibition, and besides this are shown a Corinthian capital, a chimney-piece painted in imitation of oak, with the slab in stone, a flower-stand, a piece of Gothic tracery, and other smaller articles, all illustrating the uses and advantages of the material.

It is stated by the exhibitors that these objects are supplied at a reduction of from 50 to 75 per cent. on the price of carved stone or oak. The quality of the material is good, and the style of manufacture careful and praiseworthy. The Jury recognise the importance of introducing a material so useful and so economical in many cases, especially where the absence of durable stone interferes with the construction of public building. A well-made terra-cotta may be regarded as almost indestructible by ordinary exposure; and although in colour it is generally inferior to good stone, and the parts are liable to warp in burning, yet for some kinds of ornament, and for many practical purposes, the result is everything that is needed.

A Prize Medal has also been awarded to Mr. BLANCHARD, of King Edward Street, Westminster Road, London (92), for several objects in terra-cotta, exhibited by him, including part of a Gothic pinnacle, a capital, and some small articles. These are of very excellent colour, and the details of construction are admirable. The material is described as a composition of the best white pipe-clay, crushed pottery ware, calcined flint, flour-glass, and white sand, all well amalgamated and burnt at a high temperature. The tint is exactly that of the material as it leaves the kiln, without artificial colour, wash, paint, or stopping, and is extremely uniform. It does not alter on exposure, and the works of this establishment have stood the test of time.

Mr. PULHAM, of Broxbourne (Classes XXVII. 108, and XXX. 216), is the exhibitor of several objects in red terra-cotta, some adapted for construction and others entirely ornamental. As far as material is concerned these are considered by the Jury to be worthy of a Prize Medal, while the artistic merit of the more ornamental articles is equally noticeable. The colour of some of this terra-cotta is very dark rich red.

Messrs. DOULTON and WATTS, of Lambeth, are exhibitors of sundry objects in terra-cotta and fire-clay, some of them of considerable beauty; and they exhibit, together with Messrs. HENRY DOULTON and Co., also of Lambeth, a number of excellent articles in stoneware (Class XXVII. 23, 95). Both these parties are proprietors of extensive works at Lambeth, where they carry on the manufacture of stoneware on a large scale, to which they have recently added that of terra-cotta, of which alone we speak in the present notice. The terra-cottas they exhibit include vases of large size, trusses, window-heads, and Ward's cases, the latter very beautifully and delicately constructed, though of small size. They also include a full-sized figure of Time (by Messrs. Doulton and Watts), made in one single piece of clay and fired entire without joint of any kind. The chief expense of such figures is incurred in the first moulding, and should there be a demand they could afterwards be repeated at small cost, not exceeding in this case 10*l.* or 12*l.* They are absolutely imperishable by weather. A Prize Medal has been awarded to Messrs. Doulton and Co., and Messrs. Doulton and Watts, jointly, for their combined exhibition of terra-cotta and stoneware, the latter of which will be referred to subsequently.

To Messrs. FERGUSON, MILLER, and Co. (93), a Prize Medal has been awarded for sundry goods in terra-cotta, manufactured by them of fire-clay, and burnt at a high heat. The fire-clays found in various parts of the coal measures are now much used for different purposes where refractory clay is required, and amongst the rest for ornamental vases, and figures for outside decoration in

gardens, for which they form a good artificial stone, much superior to common stone. The contraction that takes place in firing renders it somewhat difficult to model them with sufficient accuracy to insure a satisfactory result, and this is especially the case where the form required is complicated and cut up into detail. The present exhibitors have prepared some vases expressly for the Exhibition, and they have shown ingenuity in adapting the design to the material.

The GRANGEMOUTH COAL COMPANY (99) exhibit a somewhat similar series to those just described. All the articles forwarded were manufactured from a fire-clay of remarkable purity, consisting of about 64 per cent. silica, and 34½ per cent. alumina, with less than 1½ per cent. of iron, lime, and phosphates. The analysis of the clays used by these exhibitors, as given by them to the Reporter, rather shows a different combination from that of the Stourbridge clay, but the extremely small percentage of such impurities as render the clay fusible must be regarded as an important peculiarity. The vases, pedestals, and chimney-cans exhibited are all of the natural colour of the clay when burnt, none of them having been painted or otherwise coloured. The exhibitors are adjudged worthy of Honourable Mention.

The following is an analysis of the clays of two different kinds used by the exhibitors. The analyses were made by Dr. Penny, of the Andersonian University, Glasgow :—

	No. 1.	No. 2.
Silica - - - -	65.20	62.85
Alumina - - - -	33.41	35.65
Lime - - - -	.32	.45
Magnesia - - - -	.13	.15
Oxide of iron - - - -	.49	.59
Phosphates - - - -	.45	.31
	<u>100.00</u>	<u>100.00</u>

A very beautiful vase in terra-cotta, exhibited by Mr. BETTS in the West Nave, but designed by Mr. J. THOMAS (22), is considered worthy of Honourable Mention for the excellence of its form, the colour and quality of the material, and the finish of the work. Some other objects in terra-cotta are shown by Mr. Betts, of less ornamental character, but of equally good material.

An elegant but small vase, of dark red terra-cotta, is exhibited in Class I. (No. 106), by Mr. BURNETT, and is Honourably Noticed by the Jury for the smoothness of its texture and the uniformity of its tint, as well as for its form.

There are several other English exhibitors of terra-cottas and fire-clays. Of these we may first mention the GARNKIRK COMPANY (98), who have sent a fountain and several vases in fire-clay, besides some samples of salt-glazed ware. The material appears to be of fair quality and carefully worked. Messrs. J. BELL and Co. (96) have sent vases manufactured of their excellent fire-clay, which, though not very remarkable in other respects, show the quality of the material to great advantage. In Class I., No. 105, are a statue and some small objects in terra-cotta, exhibited by Mr. GRIMSLEY, of Oxford, the designs being deserving of notice, and in the same Class, exhibited on the South Wall (No. 86), is a small group in relief, manufactured of fire-clay, and sent by the BANK PARK PYROPOLITE WORKS. Some other objects in terra-cotta are exhibited from England,

but they are of comparatively small importance, or are sent rather as illustrations of material than as mineral manufactures.

From France there have been sent several objects in terra-cotta, some of them extremely remarkable, not only for beauty of material, but for taste and elegance of design, and an amount of skill in manufacture which does the highest credit to every one concerned. Of the various exhibitors the Jury have felt no difficulty in awarding a Prize Medal to MESSRS. VIREBENT BROTHERS, of Toulouse (France, 732), who have forwarded a large and most interesting series of objects of a kind of terra-cotta, originally intended for architectural decoration in restoring old ecclesiastical edifices. The colour of this artificial stone is naturally a yellowish white, but for certain objects it is produced of an Etruscan red or black. It takes all colours and gilds perfectly well, and has been long and extensively used in France, where it is not only employed for the construction and restoration of buildings, but also for statues and vases, and even for pulpits, altars, piscinas, and other decorative work in the interior of churches. The chief object exhibited is a chimney-piece of great beauty in the Renaissance style, but there is also a large series of objects adapted to church architecture. These exhibitors have received testimonials from engineers and architects of eminence.

Mr. DEJAY, of Paris (France, 45), an artist who has contributed some objects of beauty and excellence, manufactured in a kind of terra-cotta, is considered by the Jury to be worthy of Honourable Mention. Among the works of this artist are two figures which show considerable skill in design and treatment, as well as in the nature of the material.

Honourable Mention is made also of Mr. HOLSTEIN (France, 876), an exhibitor of terra-cotta mouldings; of Mr. GARNAUD, jun. (France, 233), who shows various specimens of white terra-cotta of considerable hardness, adapted to external work for houses, and also for sculpture; and of Mr. C. DE BOISSIMON (France, 427), for ornamental vases and fire-bricks. The material in all these French terra-cottas is of singularly fine quality and even texture, and the tint is remarkably delicate and uniform. The articles manufactured are in a bold free style, well modelled and well burnt, and do great credit to the several exhibitors; but the Reporter regrets that he has no special or detailed information as to the nature of the raw material, the localities in which it is found, the mixtures of the clay, sand, and broken pottery employed, or the heat of firing. It may be remarked that in all of them the colour is pale, showing an absence of iron in the clays.

There are some German exhibitors of terra-cotta, whom it is necessary to allude to. MESSRS. STAIN WASSEROTT, of Ravensburg (Wurtemberg, 69), are distinguished by the Jury with Honourable Mention as manufacturers of some very well-constructed architectural objects of a good kind of terra-cotta of red colour. These include only part of a large series of such objects, to be procured at the manufactory of the exhibitors, who have forwarded a volume exhibiting drawings of their different products, including pavements, draining and other tiles, and a large variety of mouldings, windows, and other architectural contrivances: considerable taste in the application of the material is manifest in the designs in this volume.

Mr. ERNEST MARCH (Prussia, 240), of Berlin, has sent an extensive series of dark red and pale terra-cottas, showing great merit in design, and moulded of the

dust of the high road near Berlin: much ingenuity is shown in rendering available this peculiar material, and the exhibitor is Honourably Mentioned for these terracottas, besides which, he has sent some chemical utensils. Other objects of similar material exhibited amongst the Zollverein goods, and appearing in their Catalogue, are a group of considerable elegance sent by the Government engineers at Wiesbaden, and affording good illustrations of the excellent clay of the Duchy of Nassau. There are also some imitations of freestone in clay, and other smaller objects, which we need not here particularize.

A few excellent and useful works in terra-cotta are exhibited from other countries, of which the Jury have noticed some from Switzerland worked into good designs, and others from Tuscany. The former include a font, showing much elaborateness and considerable skill, exhibited by J. ZIEGLER PELLIS (260) (awarded Honourable Mention in Class XXV.), the latter, a stove in terra cotta exhibited by L. CANTAGALLI, of Florence (Tuscany, 71), adapted to the country, but not likely to be valued in England. The colour of the former of these objects is an extremely dark red, and it well deserves Honourable Mention.

From Spain and Portugal respectively, there have been sent for exhibition specimens of the large earthen jars used in those countries for preserving oil, wine, and other substances. These jars are often made very much larger than the specimens exhibited, containing sometimes many times the quantity that these would do, but they are remarkable and interesting examples of a manufacture of great antiquity, much ingenuity, and considerable importance. The large jar (*Tinaja*) exhibited by Mr. M. YSASI (Spain, 5), is from Toboso (Mancha), and is Honourably Mentioned by the Jury. Such jars are buried in the earth in a kind of cement, and preserved in this way for an indefinite period. They are made by hand without the wheel, and are fired in an oven constructed on purpose, the interior being made use of to receive a number of small objects fired at the same time. The most celebrated and largest manufactory of these jars is at Toboso. The inside is sometimes varnished to receive spirits.

The Portuguese jar (Portugal, 410) is from Alemtejo, and is accompanied by two earthen pots used in cooking, remarkable for their extreme durability and thinness, considering the uses to which they are applied. The material is apparently a very silicious clay containing some mica.

N. GAS-RETORTS, FIRE-BRICKS, &c., AND CHEMICAL UTENSILS.

We have already mentioned the use of fire-clay (obtained generally in this country from beneath certain seams of coal), and its value in the manufacture of terra-cotta, where being burnt at a high heat, the clay requires to be of such a nature as to resist fusion, or in other words, to have the property understood by the term *refractory*. Many other specimens of manufactured fire-clay have been sent, adapted to special and most important purposes, and we proceed now to enumerate the exhibitors, and the nature and degree of excellence of the objects exhibited. It is to be regretted that there are not more exhibitors to compete with each other in this department, but some of those to whom we shall allude have sent specimens which are highly creditable.

The Reporter has had the advantage of an opinion and report communicated

by George Lowe, Esq., C.E., F.R.S., one of the Associate Jurors in this matter, whose judgment has assisted in guiding the Jury in their awards.

Messrs. JOSEPH COWEN and Co., of Blaydon Burn, Newcastle-on-Tyne (112), are exhibitors of samples of fire-clay, fire-bricks, and patent fire-clay gas retorts, which are all of admirable quality, and bear the highest reputation. The Jury have, therefore, awarded a Prize Medal to them.

The use of fire-clay is not of very ancient date, and has greatly increased within the last few years. It is found in England almost exclusively in the coal measures, and from different districts the quality is found to differ considerably. The so-called "Stourbridge clay" is the best known, and will be alluded to presently; but other kinds are almost, if not quite, as well adapted for the higher purposes of manufacture, being equally free from alkaline earths and iron, the presence of which renders the clay fusible when the heat is intense. The proportions of silica and alumina in these clays vary considerably; the former amounting sometimes to little more than 50 per cent., while in others it reaches beyond 70; the miscellaneous ingredients ranging from less than $1\frac{1}{2}$ to upwards of 7 per cent.

The works of Messrs. Cowen and Co. are among the most extensive in England, and they obtain their raw material from no less than nine different seams, admitting of great and useful mixture of clay for various purposes. After being removed from the mine, the clay is tempered by exposure to the weather in some cases for years, and is then prepared with extreme care. The objects chiefly made are fire-bricks and gas retorts; the latter being now much used and preferred to iron for durability. These retorts were first made by the present exhibitors in ten pieces (this being twenty years ago), and since then the number of pieces has been reduced successively to four, three, and two pieces, till, in 1844, they were enabled to patent a process for making them in one piece; and, at the present time, they are thus manufactured of dimensions as much as 10 ft. long by 3 ft. wide in the inside, which is, however, more than double the size of the largest exhibited by them.

The following extract from the Report with which Mr. Lowe has favoured the Jury, will be read with interest. He says,—

"I recommend this exhibitor from my own knowledge as connected with the extensive furnace work of the Chartered Gas Company during the last thirty years, at which period we were buying Stourbridge goods from 8*l.* to 10*l.* per 1000, when a fair trial of Mr. Cowen's bricks, at just one-half the price, convinced us then, and have ever since proved to us their excellency. One especial feature in these bricks and retorts visible to the eye, and so essential to their withstanding high heats, is their freedom from iron, which acts the part of a flux, destroying the otherwise good properties of many fire-clays. This he arrives at by following the Chinese practice of submitting his clay for years exposed to all weathers, turning it frequently over, whilst young hands pick out the fossiliferous fragments generally pyritous, which this disintegrating process lays open to observation. The clay contains a high percentage of silica. Add to these points great care in the manufactory, in which every appliance is to be seen, and we have nearly the secret of Mr. Cowen's fame. He has testimonials from all quarters, one from

Rouen, stating thirty-eight months as the durability of some of his retorts, being four times that of iron ones."

The fire-bricks exhibited by Messrs. Cowen are sold at from 40s. to 50s. per 1,000 on board at Newcastle, the price varying with the size. The same articles are delivered in London at from 50s. to 70s. The retorts are from 60s. to 80s. each at Newcastle, and in London from 5s. to 10s. more.

Messrs. HARPER and MOORE, of Stourbridge (119), are exhibitors of fire-clay bricks remarkable for their hardness; and they also send a glass-pot. All these objects are well made, of good colour, and free from iron; and are considered worthy of Honourable Mention. The large pots are used in the manufacture of plate, crown, and sheet glass; and those of smaller size in the manufacture of flint glass: the pots remaining in the furnace till worn out or broken, and lasting sometimes for two years. One of the vessels with an open top (called a curvett) is used to convey the melted glass from the interior of the furnace to the casting-table for plate glass, a test, perhaps, the most severe that a fire-clay vessel can be put to, but which some of those made by these exhibitors have stood 180 times without breaking. The purest fire-clay, in which iron is entirely absent, is needed for such purposes. The wholesale price of the curvetts is 40s. each.

The crucibles shown by Messrs. Harper and Moore are made by hand, and are extensively used for brass, iron, steel, silver, gold, and other metals. The bricks used for lining the inside of glass-house and other furnaces, where long-continued and intense heat is applied, are also of good quality.

Glass-house pots are also exhibited by Messrs. SQUIRES and SONS, of Stourbridge (Class I., 117), and Messrs. HARTLEY, of Sunderland.

The celebrated fire-clay used by these and other exhibitors, and so widely celebrated as Stourbridge clay, lies about 15 feet beneath the lowest of three workable seams of coal (each averaging 6 feet thick), worked at Stourbridge in the lower coal measures in the south-western extremity of the Dudley coal-field. The bed of clay is four feet thick; and the following is the composition, according to Berthier, quoted in Dufrenoy's "Mineralogie," vol. iii., p. 259:—

Silica	-	-	-	-	63.70
Alumina	-	-	-	-	22.70
Oxide of iron	-	-	-	-	2.00
Water	-	-	-	-	10.30
					100.00

Other British exhibitors of similar objects are Messrs. KING, of Stourbridge (Class I., 91), well known for their manufactures of fire-clay goods from this celebrated district, and the exhibitors of a large and interesting series, including the raw material unburnt and finished articles of manufacture, and a small model of a glass-house. Owing to some cause, the goods here shown are not altogether such as to do credit to the maker. The best objects from Messrs. King are the crucibles, and the greatest interest attaching to their group arises from the fact that the raw or unburnt pots, &c., are shown as well as those which are burnt.

Gas retorts of very fair quality are shown by Mr. RAMSAY, of Newcastle, who

has also succeeded extremely well in the manufacture of fire-bricks, chimney-pots, and other goods. The retorts show a little more iron than is desirable, but the exhibitor has been considered worthy of Honourable Mention. Retorts of less creditable appearance are exhibited by Messrs. HICKMAN and Co., of Stourbridge (Class XXVII, 107), and Mr. A. POTTER, of Newcastle (Class XXVII, 115). The surface of both these retorts is cracked and undulating. When we consider the high and long-continued temperature to which these objects are exposed, the absolute necessity of attending to every detail in mixing the clay and moulding the retort will be at once recognised; and the apparently slight defects of some of those sent for exhibition, require to be noticed as of real importance. Mr. J. PEASE (Class I., 122) is Honourably Mentioned for some fire-bricks of excellent quality exhibited by him.

Next to England, the finest specimens of fire-clay goods, on a large scale, are from Belgium, from which country there are three exhibitors of gas retorts. The Jury have awarded a Prize Medal to one of these, Mr. T. LOUCHER, of Baudour (No. 399), who has sent a well-made retort, extremely thin, of good structure, and free from surface iron and cracks. The Jury have awarded the Medal to this exhibitor on account of the undoubted superiority which it presents over other similar objects from the Continent, and do not enter on any question of priority of manufacture that may arise, or identity of methods adopted by this and other exhibitors.

The Jury have awarded Honourable Mention to Mr. A. SMAL-WERTS, of Huy, Liege (No. 398), for a neatly-made retort of rather indifferent colour; and also to Messrs. B. PASTOR and Co., of Audenne, Namur (No. 395), (granted by Class I. likewise), whose retort is extremely thin and well made (thickness only 2½ inches), but faulty in colour, the foxy appearance indicating the presence of iron, which cannot fail to act as a flux. Besides the retort, these exhibitors have sent fire-bricks and lumps, having the same fault in colour, but very beautiful in point of manipulation.

France has sent only one specimen of fire-clay gas retorts, and that not remarkable for excellence. The exhibitor is Mr. PAUWELS, of Paris (No. 1382), who exhibits also an ingenious gas moderator, which does not come before the present Jury for consideration. Fire-bricks and vases are sent by Mr. DE BOISSIMON, of Langeais (No. 427), an eminent manufacturer on the Loire, who has been already referred to, and has received Honourable Mention.

Refractory bricks are sent by two exhibitors from Portugal, and one from Spain. Of the former, some (Nos. 275 to 278) from the MANUFACTORY at BULHOENS, promise well, but there is no proof of their excellence beyond the appearance of the brick. They are, however, Honourably Mentioned, and the Jury also mention in the same way Mr. JOSE FERREIRA PINTO BASTO (Prize Medal in Class XXV.), of Vista Alegre (No. 279), who exhibits refractory bricks. The Jury are informed that these bricks are made of a clay also used for earthenware, and certainly admirably adapted for the finer works of this kind, and that the exhibitor is the discoverer of this bed, which has been used for more than a quarter of a century in the porcelain works at Vista Alegre, now very extensive. Great credit appears to be due to Mr. Pinto for the persevering industry with which he has struggled against numerous difficulties, and succeeded in introducing into his country a most

useful and important manufacture. The bricks exhibited are neat and appear of good quality. They contain much of what is technically called "grog" (coarse fragments mixed with fine paste), which renders them capable of standing a sudden application of heat without cracking, but the small extent of the exhibit does not justify the Jury in giving more than Honourable Mention.

The bricks sent by the AULENCIA COMPANY at Madrid (No. 53) are light and of open texture. The colour is very white, and the raw material, which has only been brought into use very lately, appear to be of remarkably fine quality. As there appears to be a considerable demand in Spain for various articles of fine pottery, the more extensive working out of this deposit appears to be a very important matter.

From the Zollverein we find one exhibitor of fire-clay and brick crucibles. MR. VON MULMANN, of Siegburg on the Rhine (West Prussia, 319), who also sends chemical utensils. This manufacturer makes fire-bricks for blast furnaces and puddling furnaces at a very moderate cost.

Besides the objects in refractory clay already considered, there are some others, chiefly chemical utensils, which, from their condition, magnitude, and other circumstances, are referred to Class XXVII., and which, therefore, it becomes our duty here to report upon. For this purpose the Jury called in the aid of an Associate Juror, T. H. Henry, Esq., F.R.S., and have perfect confidence in the results they have been enabled to arrive at.

The largest and most important exhibitor of crucibles manufactured of an admixture of fire-clay and plumbago, and required for purposes where an intense heat is employed, as for the melting of steel and reducing the precious metals, is Mr. H. W. RUEL, of London (Class I., 435), to whom a Prize Medal has been granted. The crucibles in question are described, both in this and other countries, as if made of plumbago, but consist, in fact, of an admixture of that mineral, in variable proportions, with the finest and purest fire-clay. The introduction of the plumbago is, however, a very important modification, and acts by preventing the injurious effects of contraction and expansion during change of temperature. Besides plumbago, other forms of carbon are sometimes used, especially pounded coke. The best crucibles for the purposes that require the greatest resistance, are either made of one-half of a finely-ground cement or paste, consisting of old crucibles and fire-clay, and one-half coke and graphite, or of larger proportions of clay; but those used for the assay of the precious metals are sometimes made of two-thirds graphite.

The crucibles of Mr. Ruel are of the very best quality, and the Associate Juror, Mr. Henry, thus reports on them:—"Mr. Ruel has so improved the black-lead or plumbago crucibles, as to drive the foreigners out of the English market, and his articles are preferred abroad. I have repeatedly tried them and have found them excellent. Messrs. Brown and Wingrove, the gold smelters, use them exclusively I understand, and in order to make sure I have asked them for a written opinion.* Ruel's assay crucibles resist the action of fused oxide of lead

* The written opinion thus requested has been submitted to the Jury, and establishes the fact that this exhibitor's crucibles are of the very best quality for all the most important purposes for which such utensils are required.

much better than any others I have tried. Mr. Ruel is, I believe, the oldest crucible-maker in this way, and I think his great merit lies in working steadily for a considerable time to improve the English manufacture, and gradually vanquish the strong prejudice in favour of a foreign article by the superiority of his own production."

TO MESSRS. LORENZ, KAPPELLER, and SON, of Hafnerszell, near Passau (Bavaria, 28), a Prize Medal has also been awarded for black-lead crucibles, which are described as of more refractory character than usual, and which appear to justify this account. The specimens sent include one of very unusual dimensions, measuring 2 feet high and 20 inches in diameter. They are very well made. These manufacturers have long enjoyed a very high reputation in the European market, and their crucibles are extensively sold, having been generally regarded as the nearest rivals to those made of Stourbridge clay.

Mr. F. COSTE, of Tilleur, Liege (Belgium, 397), is an exhibitor of plumbago crucibles of good quality, and is considered worthy of Honourable Mention. Those he exhibits are of two kinds, one of them not containing plumbago, but the former, adapted for melting steel, are so contrived as not to require removal for a fresh charge, and thus present a novelty of construction.

Other plumbago crucibles are sent by Mr. G. B. ATWOOD, of Massachusetts, (United States, No. 426), but they are understood to be really English, made from American plumbago, and are not in other respects remarkable.

TO MESSRS. C. E. and F. ARNOLD, of Elgersburg, in the Duchy of Saxe Gotha (Prussia, No. 778), Honourable Mention is awarded for a considerable variety of chemical apparatus in earthenware exhibited by them, and of very good quality. The principal objects here to be noticed are the crucibles, which are of four sorts, but there are also retorts, alembics, and distilling apparatus, besides other articles.

Mr. E. MARCH, of Berlin (Prussia, 240), has been already mentioned for his terra-cottas, but is also an exhibitor of chemical apparatus of good quality, the principal articles being two large and fine jars for distilling acid. In France we have Mr. BONNET, jun. (No. 1096), exhibiting a muffle and various chemical apparatus, considered deserving of Honourable Mention, the muffles being constructed in parts to avoid fracture by heating; and there are also some very neatly constructed crucibles, and other apparatus, exhibited by Mr. DEYEUX (France, 1382), which appear to be of very good quality.

We find exhibited in Class I. (No. 118), a number of melting-pots made for casting brass, and other metals, by Mr. S. ANSTEEY. These have been in use for some time, and are made by a patented process. They are recognised as of good quality in all respects.

O. GLAZED FIRE-CLAY GOODS.

There are several exhibitors of glazed fire-clay goods, some of them nearly approximating the manufacture of porcelain, but the articles are considered to belong to the present division of clay manufactures. One of the chief of these is the firm of Messrs. S. GREEN and Co. (125), to whom a Prize Medal has been awarded in another Class (Class XXV.), but whose salt-glazed ware demands notice here.

This ware is of various qualities, according to the purpose for which it is

required, some objects, as ginger-beer bottles, jars, &c., being comparatively coarse, while for chemical utensils it is impossible that too much care can be taken, or too much labour and ingenuity devoted to insure accuracy of form and uniformity of texture. For the principal part of the manufacture the clay is mixed, moulded, and dried, as for other pottery ware, but it is burnt in a room which admits of a degree of heat being applied which would melt any clays, unless of the finest natural quality, or very carefully prepared. In addition also to this high degree of firing, the glaze, instead of being applied by dipping, as is usual with earthenware, is produced by throwing into the furnace, at a certain stage of the process, a quantity of coarse salt, which is instantly vapourised by the intense heat, and this vapour, penetrating to every part of the kiln, produces decomposition where it touches the vessels that are being baked; a film of glass being formed by the combination of a portion of the silica of the clay surface with the soda, while any iron that exists is brought to the surface, becomes oxidized, and gives a tint of colour apparently also adding to the strength of the glaze.

Among the objects thus produced, the exhibitors to whom we have already referred, Messrs. S. Green and Co., have manufactured some of the finest and largest that have been brought into the market; but Messrs. DOULTON and Co., and DOULTON and WATTS, have also sent admirable specimens of great practical utility. Numerous examples are exhibited, both in Class XXVII. and outside the Building, in the North Western Enclosure. The Jury have especially noticed a group of objects by Messrs. Doulton and Co., including pipes of unusual size, and chemical vessels also of large size and extremely perfect; besides a series exhibited by Messrs. SINGER, remarkable for being glazed inside only, the body vitrified as usual, and the surface of the ware being dry or unglazed. The advantage of the latter condition is considered to be the less probability of cracking, on the application of heat from the outer surface expanding more readily than if salt-glazed in the usual way. All the exhibitors hitherto mentioned have been distinguished by Prize Medals; and although the manufactures in this kind of material are in no degree less important than others already described in some detail, we can only here refer to them without announcing any further reward. It may, however, safely be said, that the objects exhibited on the English side in glazed stone-ware, are worthy of great commendation for their excellence, and not less so for their great utility.*

* Although by the decision of the constituted authorities the Medal which had been awarded to Messrs. S. Green and Co., in Class XXVII., has been withdrawn in favour of the similar honour awarded by the Jury of Class XXV., the author of the present report cannot pass on to other exhibitors without giving some account of the objects which chiefly attracted the attention of his Jury. These are, the large jar, the condensers, the air-tight stoppers, and the acid pump exhibited within the Building, and the whole apparatus of the retort placed outside.

Of these the jar is stated to have a capacity of 420 gallons; and although not without flaws near the base, is yet so perfect in its essential characters, and so much larger than those usually produced, as to be an extremely remarkable and interesting object. The condensers are not only large, but perfect; and the spherical stopper and valve are so ground as to be perfectly air-tight, and must be regarded as an admirable and most useful contrivance. The jar is, perhaps, the largest piece ever manufactured in this ware; and it must be recollected that the degree of heat required to admit of the salt-glaze is extremely different from that

Mr. RUFFORD (89) has received Honourable Mention for an ingenious porcelain bath in one piece, two wash-tubs, and several glazed bricks, the former presenting a white glaze upon fire-clay, and being remarkable for its novelty and cheapness. The present exhibitor invented his process for making such baths at the instance of the Society of Arts in the season of 1846-7. The following account has been forwarded to the Reporter :—

“The stone materials for this purpose, viz, fire-clay, china-clay, and the glaze, are so assimilated that the two clays are of the same porosity, bear the same heat, expand and contract alike, and the glaze will melt only when the fire-clay is sufficiently burnt. They undergo seventy-two hours of white heat, are not sufficiently fired until cold blast cast-iron will melt, and they are produced in the glazed finished state at one burning.”

In this state they can be cut with a chisel, are perfectly non-absorbent, and are not affected by heat, cold, or damp. The full-sized adult bath costs, if perfectly free from blemish, 7*l.* First-class, such as exhibited, 5*l.* 10*s.*, or 5*s.* extra if marbled. Second class, colours not clear but body sound, 35*s.* to 60*s.* The glazed white bricks are 13*s.* 6*d.* per 100, and are found to stand well.

Mr. E. UNGERER, of Hirschberg, in Silesia (Prussia, 241), exhibits a set of water-pipes in glazed stone ware of very excellent quality, and is Honourably Mentioned by the Jury.

Messrs. SALT and MEAR, of East Liverpool, Ohio (United States, 203), exhibit a water-vase of somewhat remarkable appearance and good material, and are also Honourably Mentioned.

Miscellanea.

There are two exhibitors in a material which, as it consists of porcelain, might be referred to Class XXV., but which, being widely disconnected in its application from the ordinary uses of that material, and being included in Class XXVII., have been considered by this Jury. One of them presents an adaptation of porcelain for architectural decoration, and the other for street labels, and we can say only a few words concerning each of them.

To Messrs. BOWERS, CHALSLINOR, and WOOLSCROFT, of Tunstall, in the Staffordshire Potteries (104), a Prize Medal has been awarded for a newly-patented application of coloured and moulded porcelain for architectural decoration, capable of being carried out to a great extent, and especially adapted for door-cases and arches, window-cases and arches, string courses, bricks, and cornices for shop-fronts, &c. The material is cheap, brilliant in colour, sharp, and perfectly durable. Some of the decorations exhibited are very elegant, but they admit of great improvement, for which the material is well adapted.

A Prize Medal has also been awarded to Messrs. SKINNER and WHALLEY (121) for a vitreous marble paste in a kind of porcelain, extremely hard and durable, and better adapted for street labels than anything hitherto introduced.

used for the large jars from Spain and Portugal. In addition to the articles mentioned, is a triangular worm of a still which is perfectly air-tight, but admits of being readily and perfectly cleaned in every part. The Jury noticed with great commendation the care and attention bestowed by these exhibitors on chemical and other apparatus.

Mr. J. BRANNAM (131) has exhibited a small collection of jugs, pitchers, &c., in a stone-ware, which, although placed in Class XXVII., more properly belong to Class XXV.; and this is the case also with Messrs. WESTWOOD and MOORE (Class XXVII., 113), who send some articles of stoneware and others of glass, which we can here only mention.

A porcelain stove is exhibited from Frankfort (No. 16), by Mr. J. HOFFMAN, and other similar objects are elsewhere in the Building. Some articles in porcelain of more miscellaneous character have been considered by the Jury of Class XXV. Such are those sent by Mr. GILLE (France, 848), Messrs. MINTON, and Mr. J. G. DOWSON (Class XXII., 476), all of whom are exhibitors of chimney-pieces constructed of porcelain. The two former are noticed in Class XXV.

Messrs. MAYO and Co., of Cheapside, London, are exhibitors of a new kind of joint patented by them, and intended to connect glass pipes conveying gases or fluids (Class I. 18), and also of patent syphon vases for containing aerated mineral waters (Class XXVII., 7). Both these contrivances are useful and ingenious, and the Jury have awarded a Prize Medal to the exhibitors. The two inventions are combinations of metal with glass or pottery, and are already sanctioned by experience.

To Mr. E. J. COATES, of Bread-street (Class XXVII., 18, 19), a Prize Medal is awarded for a cheap and useful combination of iron and glass in the construction of mantel-pieces. These are very inexpensive, have a good effect, and are extremely durable, and are said to have been extensively introduced in the United States, although new in England.

A new style of glazing greenhouses and other constructions in glass has been exhibited by Mr. KENT, of Chichester (Outside, West, 62, and Class XXVII., 122), and is Honourably Mentioned by the Jury. In this method vulcanized India-rubber is introduced, and the glass is fastened without putty.

Another construction has been exhibited by Mr. DESCH (Outside, West, 61), of something of the same kind, and is also Honourably Mentioned.

Mr. LIPSCOMBE (Class XXVII., 49) is the exhibitor of several small drawing-room fountains, showing some ingenuity and elegance. There is, however, nothing very new introduced in the construction.

Mr. W. BLAKE, of New York (America, 233), exhibits a kind of earthy fire-proof cement or paint, said to form a very compact and strong film resembling slate, and quite impervious to moisture. It is described as occurring in a stratum of rock at Ohio, and is apparently a kind of clay of black colour, and readily reduced to a fine powder. Mixed with linseed oil it forms a pigment of slate or chocolate colour, which hardens on exposure, but does not crack or peel, and is adapted for outside painting, or for damp walls, decks of ships, &c.

APPENDIX.

EXPERIMENTS ON THE STRENGTH OF PORTLAND CEMENT.

Two exhibitors of Portland cement on a large scale, Messrs. J. B. WHITE and SONS, of Millbank, and Messrs. ROBINS, ASPDIN and Co., of Great Scotland Yard, to both of whom Prize Medals have been awarded, intimated to the Jury their

wish to illustrate the strength of their cement as compared with other kinds, and accordingly such members of the Jury as were in town and were able to attend, were present at a series of experiments for this purpose, on the 20th, 22nd, and 23rd September. An account of these experiments is here appended, and some further experiments were performed on the 24th September in the presence of Sir C. Pasley and some other gentlemen, an account of which, attested by them, will also be given.

The first experiments were performed by Messrs. White and Co., and were intended to show the relative strength of Portland and Roman cements. The weights used throughout were iron pigs, estimated at 100 lbs. each.

1. A block of neat Portland cement, 16 inches long, and having a sectional area of 16 inches (4 inches square), was suspended from each end, and the weight applied exactly in the centre. The block had been made four months. It broke at 1,580 lbs., including the weight of the scale (estimated at 80 lbs.). The fracture was perpendicular, even, and good.

2. An exactly similar block of neat Roman cement, made from Harwich stone, and seven weeks old, broke at 380 lbs. This must have been a bad sample of the material.

3. A similar block of neat Sheppey cement, made in the month of May, broke at 980 lbs.

4. A block of neat Portland cement, having a sectional area, measuring 21 by 2 inches, made 31st March, was pulled asunder with the fracture as shown at the top, at 2,280 lbs.

5. A block of Portland stone, having the same sectional area, and in all respects resembling the above, broke at 1,480 lbs. The fracture showed no flaw in the stone, which was of even grain and good quality.

6. Two blocks of Portland stone, being 6-inch cubes, had been cemented with about one-eighth of an inch thick of Portland cement, about four months before the experiment. The upper stone being held by iron clippers, the weights were suspended from the lower one, the depth of the holes for the clippers being five-eighths of an inch. When the weight amounted to 3,780 lbs., the former broke. The square holes for the clippers being made deeper in another part of the stone, and the scale being once more loaded, the iron hook by which the scale was suspended broke at 4,580 lbs., the cement still remaining perfectly sound. In this experiment, therefore, the strength of the cement was not absolutely tested.

7. Two similar blocks of Portland stone joined together with Roman cement, the thickness of the joint being a quarter of an inch, and the age five months, were separated by 2,780 lbs. The cement in this case left the stone partly on the upper, and partly on the lower surface, showing that the adhesive force of the cement was greater than the cohesion. It was estimated that Roman cement, under such circumstances, would separate at under 1,000 lbs.

8. Five hard stock bricks were taken, cemented together with a mixture consisting of one-half Portland cement and one-half sand. They were suspended from the upper brick, and the scale was attached to the lower. The fracture took place at 2,580 lbs. at the top brick.

9. The principal experiment of Messrs. White consisted in breaking down a beam constructed of ten courses of hollow bricks cemented together, the upper

part having three courses on edge and four flatwise, and the lower part two courses on edge and one flatwise. They were fastened with Portland cement, and strengthened by lengths of hoop iron, a number of which, amounting to fifteen, were inserted. The iron measured $1\frac{1}{4}$ inch by $\frac{1}{4}$ th nearly. The following are the dimensions of the beam :—

	FT.	IN.
Total length - - -	24	4
Length between bearings -	21	4
Depth - - - - -	4	6
Thickness at bottom - -	2	3
" top - - - - -	1	6
It was built of 1,200 hollow bricks, weighing	10,750	lbs.
32 bushels cement "	}	6,400 "
32 " sand "		
Total weight of beam -	17,150	lbs.
Weight of stone at the top of the beam -	672	"
" attached scale - - -	1,792	"
" of suspended portion of beam -	15,000	"
Total suspended weight -	17,464	lbs.

It may be well to state, that if built of common bricks and fastened with Roman cement and sand, the net weight of the beam, including scale and stone, would have been 21,207 lbs., being a difference of 3,743 lbs. resulting from the use of hollow bricks.

On the other hand, it appears that the actual area of cemented surface is only 700 square inches instead of 1,060, which it would have been if solid bricks had been employed; for it appears that the actual sectional area of the bricks is $5\frac{1}{4}$ by $4\frac{1}{4}$ inches, the rims or sides being $\frac{1}{4}$ th inch, so that the hollow part may be estimated at 9 square inches. There are in all forty vacuities, and we thus have—

	INCHES.	SQ. INCHES.
Six uppermost courses, measuring in sectional area -	$36 \times 17.25 =$	621
Three lower " " " -	$16 \times 26.6 =$	439
		1,060
Deduct spaces = 40×9 - - -	- - -	360
Total sectional area cemented - - -	- - -	700

The depth of the beam being $52\frac{1}{4}$ inches, we thus have, as a measure of the strength of the beam, $700 \times 52\frac{1}{4} = 36,750$.

One object in the peculiar form and proportions of this beam was to institute a comparison between the strength of Roman and Portland cement, a similar beam having been constructed in 1837 at Nine Elms, by Messrs. Francis and White, at the suggestion of Mr. Brunel, the bricks in which were, however, common stock bricks, bonded in the usual manner, and bedded and grouted with a mixture of equal parts of the best Roman cement and clean Thames sand. In this beam there were nineteen courses, the thirteen uppermost being two bricks thick, and the six lower ones two and a-half; the sectional area being 1,107 superficial inches,

and there were inserted fifteen lengths of hoop iron $1\frac{1}{2}$ inch by $\frac{1}{4}$ th. The beam was borne on two pieces, leaving a clear bearing of 21 feet 4 inches; and after it had been built about three months it was loaded with 11,200 lbs. of pig-iron, placed on a platform suspended from the central part of the beam. At the end of another three months the weight was increased to 24,000 lbs. After twelve months it was broken down by increasing the weight to 50,622 lbs.

The depth of this beam being 57 inches, the measure of its strength compared with that of the other is $1,107 \times 57 = 63,099$; and since $63,099 : 36,750 : 50,652 : 29,500$, it is considered by the exhibitors that the breaking weight of their beam, if in Portland cement, ought to have been 29,500 lbs.

The beam, as originally constructed on the south side of the enclosure outside the western extremity of the Exhibition, was completed in April last, and has since been left unsupported, carrying 17,464 lbs., as before explained, consisting of the full weight of the beam itself, the stone, and the scale, until the 20th September. On that day it was loaded in the centre part with 15,000 lbs. weight of pig-iron, and in this state was left till Monday, when it was carefully examined, and found free from any flaw. The loading was then continued until it was weighted with 40,000 lbs., when a deflection of nearly one-eighth of an inch was observed. Shortly afterwards, at 41,600 lbs., two cracks were detected, commencing on each side at the fourth brick from the centre, and before long a third crack exactly in the centre. One of these cracks commenced with the fracture of a brick, but the other two at the contact of the cement with bricks. When another 10,000 lbs. had been added, the iron hoop was heard to crack, and the piers were slightly affected, as was proved by the breaking of a string that had been stretched from one end to the other to measure the deflection. With this weight also the cracks extended through the six lower courses, and the deflection was about five-sixteenths of an inch. Additional weight being still put on up to 62,800 lbs., this weight was borne for a short time, but the fissures all widened manifestly; the central one extended vertically through bricks and cement indifferently, and the beam at length separated into two parts, thrusting the piers considerably out of the upright.

After the conclusion of the experiment, it was found that of the iron hoop there were only thirteen pieces traceable, and of these ten were torn asunder at the principal central crack; the other three were doubtless broken also, but at the side fissures. The important part played by the iron in this case must not be overlooked, but cannot very easily be estimated. As a practical proof, however, of the use of brick beams and their strength, this experiment is of considerable value in itself, besides affording an additional proof of the value of Portland cement.

The true comparative strength of Roman and Portland cements is, perhaps, not so well tested as if the bricks had been of the same kind in the two experiments; but estimating as nearly as circumstances will admit, it appears that the Portland bears to the Roman a ratio of $2\frac{1}{2}$ to 1 very nearly. It must, however, be remembered that the Roman cement beam had been built seventeen months, and the Portland only five, a fact greatly in favour of the former material.

The experiments of Messrs. Robins and Aspdin were of somewhat similar nature, but cannot be regarded either as identical or parallel. They were made on various mixtures of Portland cement, some of them joining together bricks and stone, and others formed into slabs of various dimensions. There was no

experiment on so large a scale as the brick beam of Messrs. White, but the other specimens were, on the whole, larger, and the illustrations were of great interest. We proceed to enumerate them.

1. A block of the shape of that shown in Experiment 4, of Messrs. White, but consisting of three parts of sand and one of Portland cement, and having a sectional area of 4 inches by 2½ inches (= 8.5 square inches) was suspended from a clip, and held a scale weighing about 1 cwt. The block had been made about one month. It broke at 2,400 lbs., including scale, the fracture resembling that in the other case, but a part of the cement being broken off by the clip.

2. A similar block, having a sectional area of 3½ by 2½ inches, and made with four parts sand and one part Portland cement, broke with 2,600 lbs., including scale. The fracture was clean, and at the lower part of the neck. The texture of the cement was even.

3. A beam of sixteen common stock bricks, joined by very thick intervals of real Portland cement, was held at the extremities, and broke by a weight of 500 lbs. suspended from the middle. In this case the part broken was the brick only. The beam had been made one month.

4. A similar beam of the same magnitude, but having one end only supported, and projecting 3 feet 2½ inches from the bearing point, was weighted and broke with 256 lbs., exclusive of the scale suspended from the free extremity. In this case the fracture took place at the eleventh brick from the fixed extremity, and both brick and cement were fractured.

5. Another beam of twenty-two bricks, also fixed at one extremity (only the number free being reckoned), was broken by 1½ cwt., in addition to the scale. The length of this beam was 51 inches.

6. A solid step, constructed of two parts Portland cement and one part broken brick, and weighing 3½ cwt., was fixed at one extremity, leaving 6 feet 4½ inches projecting. It supported its own weight, and broke off close to the bearing point, when the third weight of 56 lbs. (making a total of 168 lbs.), was placed on the extreme end.

7. Two blocks of neat cement, 1 foot 5½ inches long, 9 inches wide, and 4½ inches thick, cemented together with neat cement broke at 6,000 lbs. The lower part of the block gave way.

8. Twenty stock bricks in courses, united with cement, composed of one of cement and one of sand, 3 feet 6½ inches bearing, the ends supported by iron clamps, and the weight applied to the centre. The bricks broke at a weight of 1,200 lbs.

9. Six fire-bricks in courses, joints all cement. The upper brick broke at 2,836 lbs.

10. The five fire-bricks from the last trial were again tested, the iron being inserted in the second brick from each end. The upper brick broke, carrying with it also a part of the lower weight, 4,600 lbs.

11. Two pieces of Portland stone, 2 feet by 11½ inches, 7½ inches thick, neat cement joints. The lower stone broke, carrying away a very small portion of the cement joint; weight 7,272 lbs.

The last five experiments (No. 7 to 11) were performed on the 23rd September, in the presence of General Sir Charles Pasley, C.B., Professor Wappler, of Vienna,

and other scientific gentlemen, by the two former of whom the above statement is attested.

The Jury have great satisfaction in placing these experiments on record as among the results of the Exhibition. They cannot fail to be regarded with much interest by every one connected with engineering and the arts of construction, and, combined with what was before known on the subject, they fully prove the value of the peculiar material known as Portland cement, and its great advantage over the Roman or Parker's cement. There can be little doubt that the mud of many rivers running over soft calcareous rock, and containing also a large percentage of clay, might be used with advantage, as well as the mud of the Medway; but it yet remains to determine the true chemical cause of the great difference observable in similar proportions of calcareous and argillaceous matter for the purposes of cement, and till this is done, it can hardly be expected that artificial cements will exactly replace those which occur naturally, and whose value has been proved by experience.

Although it did not form one of the subjects of the experiments instituted before the Jury to prove the resistance of Portland cement to crushing weights, it may not be out of place to add here the results of experiments on this subject.

A block of neat Portland cement, manufactured by Messrs. Robins, Aspdin, and Co., thirty days old, measuring 18 inches $\times$ 9 $\times$ 9, was tested by a Bramah's hydrostatic press, and is said to have withstood a pressure of 41 tons for upwards of a minute, when it broke up with a report.

A similar block, of one part cement and one sand, twenty-eight days old, crushed at 108 tons. Another, four sand and one cement, at 45 tons; and another, nine sand and one cement, crushed at $4\frac{1}{2}$ tons.

A small piece of neat Portland cement, exposing a surface of $1\frac{1}{2}$ inch by 1 inch, and six months old, withstood a pressure of 40,320 lbs., while a piece of Portland stone of the same size crushed at 2,576 lbs.

D. T. ANSTED, *Reporter.*

London, October 1851.

CLASS XXVIII.

REPORT ON MANUFACTURES FROM ANIMAL AND VEGETABLE SUBSTANCES, NOT BEING WOVEN, FELTED, OR INCLUDED IN OTHER SECTIONS.

Jury.

DON JOAQUIN ALFONSO, *Chairman*, Spain ; Director of the Conservatory of Arts, Madrid.

J. E. GRAY, F.R.S., P.B.S., *Deputy Chairman*, British Museum ; Keeper of the Zoological Department, British Museum.

REV. GORHAM D. ABBOTT, United States ; Spingler Institute, New York City.

A. J. BALARD, France ; Member of Institute.

DR. E. LANKESTER, F.R.S., *Reporter*, 22 Old Burlington Street ; Secretary to the Ray Society.

T. J. MILLER, 7 Millbank Street ; Merchant.

G. PETERSON, Russia ; Member of the Scientific Committee for the Administration of the Domains of the Empire.

T. A. WISE, M.D., 9 Prince's Gate, Hyde Park ; Hon. East India Company.

Associate.

NATALIE BONDOT, 1 Rue Fontaine, St. George's, Paris ; Late of the Embassy to China, &c., &c. Juror Class XXVI.

IN commencing their labours, the Jury thought it advisable to divide themselves into Sub-Committees for the purpose of examining the various objects submitted to their attention. The subdivisions of the Class enabled them to do this with facility, and the following Sub-Juries were formed :—

The Chairman, DON JOAQUIN ALFONSO, M. BALARD, and DR. LANKESTER for Sections A and B, including gutta percha and caoutchouc manufactures.

Messrs GRAY, ABBOTT, and WISE for Sections B and C, including manufactures from various animal substances, as ivory, tortoiseshell, horn, &c. ; and from vegetable substances, as wood, vegetable ivory, cork, &c.

Messrs MILLER and PETERSON for Sections E and F, embracing manufactures of straw, and of a miscellaneous kind from various animal and vegetable substances.

DR. LANKESTER and DR. WISE were appointed to draw up the present Report. The avocations of the latter gentleman having called him from town, the drawing up of the Report devolved on Dr. Lankester. Each of the Sub-Juries was requested to furnish the Reporter with remarks upon the various objects in their Sections ; and the Reporter is indebted for a large proportion of the general remarks on the manufactures in caoutchouc and gutta percha to M. BALARD.

The constitution of this Class is somewhat peculiar and exceptional. The

necessity for its existence was felt in the fact that a large number of articles manufactured from vegetable and animal substances could not properly be included in the Classes which embraced either woven or felted materials. This was especially the case with the very numerous applications of caoutchouc and gutta percha to the production of articles of constant and increasing use. What is true generally of these substances was felt in relation to many things manufactured from such animal substances as horn, ivory, whalebone, &c., and the vegetable substances—cork, vegetable ivory, and cocoa-nut fibres. At the same time the Jury experienced some difficulty in defining what articles rightly belonged to their Class without trenching upon the domain of others. This difficulty had evidently been felt in the disposal in the Building of many of the objects exhibited, and one of their first tasks was to send to other Classes objects which had been placed in Class XXVIII., and which had appeared under this head in the Official Catalogue. They had also to examine other Classes for the purpose of bringing objects into their own Class, which otherwise might have been overlooked. With all the other precautions taken by the Jury, it is to be feared that some objects properly belonging to their Class, from being placed in other Classes or from not being in the Catalogue, have not received the attention they deserved. Especially have they felt that many articles exhibited in the foreign department, from being sent to the Exhibition after the awards were made, may have escaped the notice which their merits would otherwise have demanded.

In presenting this Report, the Reporter has adopted the plan laid down in the scheme of "Heads for Juries," published by the Royal Commission, each Section of the Class, where necessary, being treated of under the following heads:—
1. General Remarks. 2. Council Medals. 3. Prize Medals. 4. Honourable Mentions. 5. Remaining Exhibitors.

SECTION A.—MANUFACTURES FROM CAOUTCHOUC.

§ 1. General Remarks.

The existence of a milky juice in many plants, which flows from them when their tissues are wounded, is a fact that has been familiarly known from time immemorial. It is, however, only a matter of recent discovery that this milky juice characterizes certain families of plants. Although the great majority of plants which yield this juice in abundance are tropical, yet they are not without their European representatives. The spurge, dandelion, andcelandine of our road-sides are instances. The families of plants which furnish this milky juice in the greatest abundance are, *Moraceæ*, *Euphorbiaceæ*, *Artocarpææ*, *Apocynaceæ*, *Cichoraceæ*, *Papaveraceæ*, *Campanulaceæ*, and *Lobeliaceæ*.

This juice, which is called by botanists "the milky juice," because it has an appearance similar to milk, has also the physical constitution of that fluid. It is an aqueous liquid, charged with soluble matter, in which float globules of a substance insoluble in water, and which are by their tenuity held in suspension in the liquid, but for which they have no affinity, in the same manner as butter is held in suspension by milk. From the difference of the refractive powers of these two substances, each of which, taken separately, would be colourless or

transparent, arise the opacity and white colour of the two : hence the compound is properly called a "milky juice."

The analogies which this juice exhibits with the milk of animals and vegetable emulsions are seen in the manner in which it acts when left to itself. Run out into the air, received and preserved in close vessels, it separates itself into two layers, as milk itself would do. The watery part very soon has an insoluble part floating upon it, which collects together, and swims at the top as cream swims upon milk, and which forms nearly the half of the entire mass.

But with these physical resemblances the analogies cease. That which in milk and in emulsions produced from seeds collects on the surface of the aqueous liquor, is, properly speaking, a fatty body, containing oxygen in its composition, as they all do ; while the kind of cream which swims upon the milky juice of plants when left to itself, is one of the compounds of carbon and hydrogen which are found so frequently in organic bodies. The latter, when obtained for commercial purposes, bears the Indian name of *caoutchouc*.

This substance has long been known to the natives of both the Old and New World, in Hindostan and South America. It was not, however, till the expedition of the French Academicians to South America in 1735, that its properties and nature were made known in Europe by a memoir upon it by M. de la Condamine. This notice excited little attention ; and subsequently notices of this substance were sent to the French Academy in 1751 by M. Fresneau, and in 1768 by M. Macquer. At the latter end of the last century and the beginning of the present it was brought into this country in small quantities, where, on account of its being used for rubbing out black-lead pencil marks, it acquired the name of India-rubber.

Although, after its application to the water-proofing of garments, its consumption gradually increased, the importation into the United Kingdom in 1830 appears not to have been more than 50,000 pounds. In 1842 the import of this article had increased to between 700,000 and 800,000 pounds. Up to the present time the consumption of India-rubber has prodigiously increased ; and one port alone in South America is said now to send to Great Britain nearly 4,000 cwts. annually. To the large consumption in the United Kingdom we must add that of America, where the application of caoutchouc has been much more general and successful than even in our own country.

The particular species of plants which are employed for procuring India-rubber are very numerous, and it is probable that many yield it which are not yet known to botanists. The tree which supplies most in Continental India is the *Ficus elastica*, a tree belonging to the order *Moraceæ* ; it is exceedingly abundant in Assam. All the species of *ficus* yield caoutchouc to a greater or less extent in their juices, and even the common fig (*Ficus carica*) of Europe contains it. Species of *ficus* produce the caoutchouc brought from Java, and *F. radula*, *F. elliptica*, and *F. prinoidea* are amongst those mentioned as affording a portion of that brought from America. Next to the *Moraceæ*, the order *Euphorbiaceæ* yields the largest quantity of caoutchouc. The *Siphonia elastica*, a plant found in Guiana, Brazil, and extending over a large district of Central America, yields the best kinds of India-rubber that are brought into the markets of Europe and America. To another order, *Apocynaceæ*, we are indebted for the caoutchouc which is

brought from the islands of the Indian Archipelago. The plant which is the source of this substance in those districts is the *Urceola elastica*, a climbing plant of very rapid growth and gigantic dimensions. A single tree is said to yield, by tapping, from 50 to 60 lbs. annually. Many other plants of this order yield caoutchouc, and of those given on good authority we may mention *Collophora utilis* and *Cameraria latifolia*, plants of South America; *Paheia gummifera*, in Madagascar; and *Willughbeia edulis* in the East Indies. To this order belongs the cow-tree, or *Hya hya* (*Tabernaemontana utilis*), of tropical America, which yields a milky juice that is drunk by the natives of the district in which it grows.

The caoutchouc, whilst it is in the tissues of the plant, is evidently in a fluid condition, but after its separation from the other fluid parts, its consistence becomes changed, and it forms a solid mass similar, in its external characters, to vegetable albumen. In this state it is dense and hard, but may be separated and rolled out so as to form a sheet resembling leather. It has many interesting and peculiar properties. Insoluble in water and in alcohol, it dissolves in ether, in the sulphuret of carbon, the fat oils, and the liquid carhurets of hydrogen.

It is soft and elastic at the ordinary temperature, but at the temperature of 2° above the freezing point it acquires the hardness of wood. A temperature of 100° softens it without altering its form. It then unites with itself with the greatest facility, and two pieces recently cut apart reunite so as to render it impossible to discover where the junction has taken place. But a higher temperature, approaching 150° , changes it into an adhesive substance, which, on cooling, does not recover the primitive properties of caoutchouc.

In this state of recent coagulation, and while still in a pulpy condition, caoutchouc possesses a degree of plasticity which admits of its receiving, by means of moulds, the most varied forms.

The greater part of the caoutchouc of commerce is obtained by the natives of the countries in which it is produced, in the form of shapeless masses, collected at the foot of the tree which has been incised or cut, for the purpose of extracting the juice from it, or solidified in a trench made in the earth, and coagulated in this rude mould in voluminous masses, which often resemble the trunk of a large tree. A part of it, however, possesses other forms, which the rude art of the natives attempts to communicate to it. They model, with plastic clay, figures of animals, imitations of the human foot, and pear-shaped bodies, and then dipping these moulds in the thickened caoutchouc, and renewing the connexion when the first coat is solidified by exposure to the air, they obtain, by breaking the mould and getting it out in fragments through an opening properly arranged, hollow flasks, figures of animals, rough slippers, &c. They thus make caoutchouc serve for the manufacture of objects for which we ourselves employ animal membranes and leather.

Caoutchouc is obtained from both the Old and New World. The East Indies furnish caoutchouc, of which numerous specimens have been exhibited in the Crystal Palace by the East India Company. This caoutchouc, which comes principally from Java, is often glutinous, and is less esteemed in commerce than that furnished by the equatorial regions of America. Great quantities of caoutchouc are imported into Europe from Mexico, from South America, and especially from the province of Para, in Brazil. That which comes in the shape of bottles is

generally preferred, and when it is pure, and the different coats which comprise it are well united, it may be employed immediately for many purposes. But it often happens that the coats which form the pear-shaped masses are badly united. It then becomes necessary, in order to make use of them, to work it up by a process of kneading, so as to obtain it in a coherent or homogeneous mass. This operation becomes especially indispensable when, as most commonly happens, the caoutchouc is in large impure masses, and mixed with sand and the *débris* of vegetable matter. These impurities do not entirely proceed from the moulds made in the earth, into which the juice has been allowed to exude, and in which it has been left to thicken and solidify, but their quantity and their presence between the coats of the pyriform masses show that the impurity is mainly to be attributed to fraud. The caoutchouc thus obtained is not applicable to any use until it has undergone a previous purification.

The purification of the caoutchouc is accomplished by submitting the impure caoutchouc to the action of cylinders furnished with teeth turning in opposite directions and with unequal velocities, which cause it to undergo a kind of mastication. If the matter which renders the caoutchouc impure adheres very closely when dry, this property is lost when it is moistened. From this it happens that, by causing a small jet of water to flow into the apparatus, these foreign matters, crushed by the mill, are carried off by degrees, and the purified portions of caoutchouc unite the one with the other. By the subsequent exposure of these masses of purified caoutchouc to a second mastication, but performed dry, they are softened by the heat evolved during the forcible compression to which they are then submitted. In this treatment the caoutchouc becomes softened without being liquified, and a homogeneous mass is formed which is cut in the form of rectangular blocks.

These are again placed in casting moulds, in which they are powerfully compressed, until they are completely cooled, when it is found that the pressure has freed them from cavities, air-bubbles, &c. By submitting them to the action of knives moved very rapidly by a mechanical action, and the edges of which are constantly kept wet by a thin jet of water, the caoutchouc is cut into sheets of various thicknesses, which, subdivided in their turn, constitute those small parallelopipedons used by draughtsmen to rub out the marks of black-lead pencils.

This use of caoutchouc was, in England, for a long time the only one to which it was applied, but this limited use was far from indicating the extent to which caoutchouc has been employed in the last thirty years, or the multiplicity of services it has been called upon to perform for sanatory and industrial purposes. To rub out pencil marks, to form the rude slippers which seemed well adapted to the Indian toilet, but to which a form acceptable in Europe had not been imparted, were, in fact, the only uses to which caoutchouc was applied up to 1820. In England was discovered the art of stretching it into thin sheets, and thus making it available for the production of waterproof fabrics. In France was discovered the art of drawing it out into delicate threads for the manufacture of elastic tissues. We are indebted to Messrs. Mackintosh and Hancock for the application of caoutchouc to the rendering tissues waterproof, and for the manufacture of those garments which throughout the world have rendered unquestioned

service to the cause of health, and have made the name of one of their inventors so justly popular.

The garments called Mackintoshes are well known. They are formed of fabrics covered on one side with caoutchouc, or two fabrics are united by the caoutchouc between. They are thus rendered impermeable to water, but at the same time they possess a flexibility such as it had never been possible to obtain by the employment of other varnishes. For the purpose of obtaining the sheet of caoutchouc sufficiently thin for this purpose, it is dissolved. The solid carburets of hydrogen are soluble in the liquid carburets, and for this purpose spirits of turpentine and the volatile products of coal tar were first employed. But after having obtained this solution, it was necessary to evaporate a great quantity of it for the purpose of obtaining a coating of caoutchouc, which at first occupying a great space, should be reduced to a small one when the drying was complete. For the purpose, however, of economising the solvent, a method is employed of kneading the caoutchouc, by means of powerful machines, with the spirit of turpentine or naphtha, and impregnating it with the menstrua without dissolving it, and softening it without making it a liquid; the caoutchouc rendered pulpy, is then spread upon the cloths by means of a flattening mill, and the process of evaporation is thus dispensed with. Waterproof garments were thus rendered cheap and available for the use of every class. This description of garment, nevertheless, presented a notable fault which was not avoided until a later period, and which arose out of the properties inherent in the caoutchouc itself. This substance, which in ordinary circumstances possesses very great elasticity, such as to justify the name by which it is designated in France, *gomme élastique* (elastic gum), loses this elasticity when exposed to a temperature near the freezing point of water, and this suppleness, which might almost cause a sheet of caoutchouc to be mistaken for an animal membrane, gives place all at once to the rigidity exhibited by the same membrane when dried. This property, which in cold weather was a real defect, when applied to fabrics rendered waterproof by caoutchouc, has been found very useful in the making of garters, braces, and other articles in which the elasticity of the caoutchouc has been brought to supersede that which had, until then, been obtained by the employment of spiral metallic springs. In order to obtain the threads which are used for the manufacture of elastic tissues, either the flasks of caoutchouc in its natural state, cut in half and flattened by pressuro, or else those masses of purified caoutchouc which are sold in continuous sheets, cut by knives, wetted by a small jet of water, are employed. These sheets are divided into thongs, the latter are afterwards subdivided into very narrow bands, which serve in their turn to produce the threads employed for the manufacture of the tissues. If by a slight elevation of temperature the natural elasticity of the caoutchouc is increased, these narrow bands can then be stretched into threads of great length by drawing them out, and rolling them upon bobbins. But it may be well conceived that the management and weaving of the threads would be very difficult if they retained their elasticity. Fortunately the particles of the caoutchouc eventually accommodate themselves to the forced position which they have been made to assume, and the exposure to a low temperature materially hastens this result. The threads having thus lost their elasticity can then be introduced like common threads into the fabrication

of stuffs; they can be covered with a different thread, by winding spirally round them cotton, silk, &c., and this compound thread may be in its turn introduced into the composition of new tissues. In all these operations the caoutchouc has retained all its rigidity, but that elasticity of which it has been deprived by a long distension and a low temperature, can be restored to it by means of a proper degree of heat. The stuff thus woven is exposed to a temperature of from 140° to 160° Fahrenheit by the passage of a hot iron, when each thread resumes with its primitive length the diameter which it first possessed. The fabric diminishes in length without increasing in width. The tissue is thus compressed, and the caoutchouc, which has regained its elasticity, communicates it in a permanent manner to these tissues. The manufacture of these threads of caoutchouc constitutes at present a distinct branch of industry from that which, making use of them either in an uncovered state, or covered with silk and cotton, combines them with ordinary threads in the way of weaving; and, like the manufacturers of linen or cotton fabrics, the makers of the elastic tissues buy the threads of caoutchouc in bobbins of different numbers. When the limited lengths of the narrow bands from which these threads are manufactured is borne in mind, the necessity is foreseen of being able to unite them end to end for the purpose of making continuous threads. A remarkable property of caoutchouc renders this easy. It unites with itself with the greatest readiness if it be the least warm; and two surfaces recently cut with a very sharp instrument, may be made to adhere together by means of pressure, with a cohesion equal to that which unites the other parts of the same thread. But although in this case this property is made useful, in other instances the limited elasticity, and the rigidity communicated to it by a low temperature, are great drawbacks.

However, all these properties inimical to its use disappear in that combination of sulphur with caoutchouc called vulcanized India-rubber, which exhibits such special properties as to form in some degree a new substance. This transformation of caoutchouc was first applied to practical purposes in America.

While in England the employment of caoutchouc was being developed principally in regard to the rendering of cloths waterproof, and in France its elasticity was being made available for the manufacture of certain tissues, it was turned to account in America for waterproof shoes, by making use of the processes discovered by Mr. Charles Goodyear, who, since 1836, had been engaged in the discovery of means for making use of caoutchouc, with a skill and perseverance which have borne the most happy fruits. It is not that attempts at fashioning according to the European taste, and thus rendering useful the Indian shoe made of caoutchouc, had not been frequently made in Europe, but these attempts had hardly been successful in giving them acceptable forms, and the stiffening by cold rendered them very inconvenient. However, Mr. Goodyear at last succeeded in making shoes of raw India-rubber purified, and perfectly free from objection, thus completing by the manufacture of waterproof shoes the service which Mackintosh had begun by the invention of the garments which bear his name. Since 1842 Mr. Goodyear has imported into Europe shoes which possess an unlimited and permanent elasticity, and which resist cold; two of their surfaces may be pressed against each other without the least adhesion taking place. These are precisely the remarkable qualities which characterize that caout-

chouc which is called in the present day vulcanized India-rubber. Impressed, perhaps, with the idea, too often moreover a just one, that the specification of a patent is sometimes nothing more than the occasion of attracting the attention of imitators, Mr. Goodyear took no patent for this article, but he endeavoured in Europe to take advantage of his discovery, by communicating it as a process of which he alone possessed the secret, which might be lost to mankind and disappear with its sole possessor, when Mr. Thomas Hancock, of Stoke Newington, who had been engaged in Europe in the working of caoutchouc with no less perseverance and success than Mr. Goodyear in America, discovered anew the process of the vulcanization of India-rubber, and secured it by a patent, which Mr. Goodyear afterwards demanded for the same subject. Mr. Thomas Hancock discovered that a band of caoutchouc dipped into melted sulphur, and impregnated with this substance, without losing any of its properties, only required to be afterwards exposed to a temperature of about 300° Fahrenheit, to acquire properties entirely novel, which were precisely those possessed by the material employed by Mr. Goodyear for the waterproof shoes.

This was, as may be seen, a new discovery of a fact already known—a novel solution of a problem which was known to be soluble, since it had been already solved. This discovery must however have presented its difficulties, and required also the fortuitous co-operation of favourable circumstances. For though analysis might have pointed out to Mr. Hancock the existence of sulphur in the productions of Mr. Goodyear, and have also disclosed the presence of the salts of lead which the latter had deemed indispensable, it could not in any manner give him a clue to the discovery of the essential condition of this transformation, that is to say, the employment of a given temperature which alone was able to impart to the mixture of caoutchouc and sulphur, the new properties which appeared to make of it an entirely new body.

Whatever may be the share of merit assigned to Mr. Goodyear and to Mr. Hancock in this important invention, the latter has not the less exclusive merit of having discovered that sulphur was the sole cause of the vulcanization of India-rubber. On seeing Mr. Charles Goodyear introducing the different salts of lead into the specification of the patent which he subsequently took out, it is felt that he regarded their intervention as indispensable, while it is now demonstrated that sulphur alone is sufficient; if other substances are employed in certain cases, it is not so much to aid in the vulcanization of the caoutchouc as to add to its weight and solidity.

The vulcanization of India-rubber is an easy process. The India-rubber, softened by the heat evolved when it is being kneaded by strong machines, is mixed with the sulphur in the masticating apparatus already alluded to. This mixture retains all the solubility of the caoutchouc in the different menstrua,—the property of becoming hard at a low temperature as well as that of uniting with itself; but as soon as it is exposed to a temperature of 300° Fahrenheit,—a temperature which would have sufficed to change the pure caoutchouc,—the matter acquires new properties. It is no longer soluble in the menstrua which dissolve caoutchouc, but is impregnated with them by contact, and swells out like an animal membrane that is moistened with water; resuming its primitive properties on being dried. It no longer becomes rigid when exposed to cold, nor

does it unite with itself, and it resists without any alteration a temperature which would have sufficed to transform the ordinary caoutchouc into a sticky matter; it is, in short, vulcanized India-rubber. This absence of the tendency to adhesion is so decided, that in actual manufacture no use whatever can be made of the shavings of the caoutchouc thus modified, and the means of separating the sulphur and reproducing the pure caoutchouc presents at the present day an important problem to solve. If this action of heat which modifies the caoutchouc is exercised upon a mixture enclosed and compressed in a mould, the material then acquires a form which the indefinite and permanent elasticity of the vulcanized India-rubber causes it to retain.

This sulphurization of the India-rubber, instead of being produced with free sulphur, may be obtained with sulphur in a state of combination, as with the chloride of sulphur. If articles of common caoutchouc are immersed for one or two minutes in chloride of sulphur, diluted in 50 or 60 times its weight of sulphuret of carbon, they acquire by exposure to a proper temperature all the properties of vulcanized India-rubber. In commerce this caoutchouc is designated by the name of *converted caoutchouc*.

From the moment in which the vulcanization of India-rubber was known, all the inconveniences which ordinary caoutchouc presented having disappeared, its employment received an extension which is continually increasing, and each year sees new applications of this product spring into use. The enumeration of the objects exhibited by the two manufacturers to whom this branch of manufacture is the most indebted, Mr. Goodyear, in America, and the firm of Mackintosh, in Europe, will tend to show how widely spread and how varied the use of this material has already become.

§ 2. Council Medals.

1. CHARLES MACKINTOSH and Co., 73, Aldermanbury (Off. Cat., 76). The firm of Charles Mackintosh and Co. comprises the names of the men who in Europe have made the most useful discoveries in the art of applying caoutchouc to the most varied uses:—the late Mr. Mackintosh, who gave his own name to the waterproof garments, and Mr. Thomas Hancock, whose share of merit in the discovery of the vulcanization of India-rubber we have already mentioned. In going through the collection of articles exhibited by this firm, the importance of the uses to which the substance is capable of being applied, especially since the discovery of the process of vulcanization, can be readily appreciated.

The kinds of fabrics with which the garments called Mackintoshes are manufactured have always remained the same, but the garments themselves have acquired more lightness and less smell, and the substitution of vulcanized for common caoutchouc insures to them at the present day a permanent suppleness.

The other services which these fabrics are called upon to perform have been greatly multiplied. Their price having become less, they are capable of being applied in lieu of tarpaulings for covering waggons, carriages, &c. The property which they possess of serving to contain water, and which had at first been made available for a well-known therapeutic use, has allowed of their being made into portable baths, which can be rolled up like an ordinary cloth when not in use.

The shoes exhibited by Messrs. Mackintosh and Co. are made with much care, and with a degree of elegance which shows that in Europe these articles are but little used except by the more opulent classes.

It is not only in the making of shoes that India-rubber has been called in to supersede leather; the articles exhibited by Messrs. Mackintosh and Co. show the use that can be made of it to form pistons of pumps, and how conical valves of India-rubber can be advantageously substituted for leather or metal ones. Sheets of caoutchouc of different colours, either smooth or worked in relief, are brought in to supersede moulded ornaments in the manufacture of furniture, of ottomans, and in the binding of books.

The use of vulcanized India-rubber to form the piston-valves in steam-engines on the screw principle, has greatly contributed to the employment of these novel motive powers, which are destined in some degree to effect a change in navigation by allowing steam to come in solely as an auxiliary to the wind. The exhibition of Messrs. Mackintosh and Co. comprises a valve of this description, which after six months' use has undergone so little alteration that it may be foreseen that these articles possess an almost unlimited durability. The rendering available the impermeability of their fabrics to air and gas has likewise been extended. To the air-cushions which have been long used are now added the air-mattresses, so well adapted as beds for travellers and invalids; boats inflated with air, at once portable and incapable of sinking, and which for life-boat uses and in inland voyages are capable of rendering great service. The collection of Messrs. Mackintosh presents some specimens of this kind of great interest. Lieut. Halkett, of the Royal Navy, by making them in several closed compartments in such a manner that the stuff being pierced through at one point cannot lead as a necessary consequence to the sinking of the boat, has rendered more certain the services which these machines are called upon to perform. The applications of the elasticity of caoutchouc have also been greatly increased. The wheels of carriages have been surrounded by it in such a manner as to prevent the disagreeable noise which they make upon the pavement. Rollers for inking printing types and lithographic stones have been made from it; it is employed for the making of cushions for billiard tables, and to supersede the use of sacking-cords in bedsteads. Advantage has been taken of the elasticity of an India-rubber band, which has a tendency to return to its primitive length when the action of opening a door has elongated it, for the purpose of forming door-springs, the use of which is beginning to spread widely.

The force with which caoutchouc untwists itself when it has been twisted, has caused it to be employed in the mechanism of window-blinds.

A thin tube of India-rubber, of tolerably large diameter, but flattened at the bottom so that it terminates in two flat edges, which the elasticity keeps in juxtaposition, constitutes an apparatus of extreme simplicity which perfectly supersedes ordinary hydraulic valves. The edges which are in contact below open by the pressure of any liquid passing through the tube, and close when the liquid has run out, thus preventing any fetid gas escaping from below. The elasticity of India-rubber has made a ring of it applicable for uniting cast-iron or earthen tubes used for the conveyance of water. This indestructible and moveable tube, which admits of widening and allows the pipes to slide one within another,

presents a method of fitting which seems destined to render notable service in the conveyance of water in large towns.

A thin hollow sphere of India-rubber, terminating in an appendage in the form of a tube, introduced in a flaccid state into an opening accidentally made in gas or water-pipes, may by means of being expanded by inflation, be used to press upon the sides of these pipes, and thus present a method of occlusion of great simplicity, which will allow these pipes, which it has become necessary to replace, to be removed without inconvenience.

Mr. Richard Edward Hodges has lately proposed to make use of cords of vulcanized India-rubber as a means of rendering its elasticity serviceable in raising weights, and has offered by the use of different cords, which are to be stretched successively and then released all at once, a method of throwing projectiles, and especially harpoons, with increased force. This invention is as yet too new for any one to be able to judge of it by experiments on a large scale. The source of power in this application of India-rubber presents a curious physical problem, as it is evidently not at once reducible to the other powers of mechanical force.

The substitution of vulcanized India-rubber for metallic springs in the buffers of locomotive-engines, is one of great service. The masses of vulcanized India-rubber deaden the shocks with an ease which may cause this employment of caoutchouc to be considered as one of the most useful to which it has been applied up to the present day.

A certain number of the novel applications are due to Messrs. Charles Mackintosh and Co. The ability which they have displayed in the manufacture of caoutchouc has afforded to other inventors of these new applications the means of putting their ideas into practice. Without the discovery of vulcanized India-rubber they could, moreover, never have been carried out. The Jury, therefore, in order to recompense the considerable services rendered in the employment of caoutchouc by Messrs. Mackintosh, Hancock, and their other partners, have awarded a Council Medal to the firm of Charles Mackintosh and Co.

2. CHARLES GOODYEAR, Newhaven, Connecticut, United States (Off. Cat. 378). Mr. Charles Goodyear, of Newhaven, Connecticut, exhibits a very remarkable collection of productions in caoutchouc, manufactured in the United States in numerous manufactories by processes which are his own, and for which he has patents in his own country. The eighteen to twenty licences granted by Mr. Goodyear for the use of his processes, and a capital of more than 2,000,000*l.* expended in the establishment of his manufactories, attest the importance which this branch of manufacture has attained in America. Mr. Goodyear exhibits in his collection a number of articles of the same kind as those manufactured in Europe, whether with vulcanized India-rubber alone, as springs for waggons, elastic maps, balloons, sponge-bags, tobacco-pouches, or with India-rubber covered upon one or both sides with stuffs of various natures, or uniting together two fabrics by a coating of waterproof material, according to the processes originally employed by Mr. Mackintosh. In the manufacture of air-cushions and mattresses, and especially in that of waterproof garments, more strength and greater thickness are to be remarked than in the articles manufactured in Europe, but with less finish in the workmanship and less elegance in the forms. It may be thus clearly seen that these articles, which are as yet only used in Europe as objects of

luxury or of more refined comfort, have already in America entered into general consumption, and become, by their price, within the reach of the least opulent classes, to the tastes and wants of which the manufacturer has been compelled to accommodate himself. Providence has given us in caoutchouc a species of natural leather, plastic and impermeable to water, and which is especially adapted to increase the well-being of that class of workmen, the nature of whose occupations compels them to encounter the inclemency of the atmosphere. In the manufacture of these articles it is, therefore, of importance that the resources and requirements of individuals of this class should be kept in view. Besides these articles common to the manufactures of America and of Europe, Mr. Charles Goodyear exhibits a series of productions which have interested the Jury in a high degree by their novelty, and which promise to become the object of numerous and novel applications.

The ordinary cloths covered with India-rubber present a great resistance when they are pulled in the direction of the fibres, but they tear with great facility if they are made to undergo a traction tending to separate the threads united by the weaving. This is an inconvenience which might stand in the way of some of their uses, and against which Mr. Goodyear has succeeded in providing by the fabrication of a species of stuff or felt, which he manufactures by machines of his own invention. This stuff, formed in successive layers and in variable numbers of threads crossed in different directions, constitutes a species of regular felt obtained by mechanical means, which can be produced at a low price, and is capable of supporting a traction in any direction.

By covering these stuffs, formed of three, four, and even five and six coats of entangled threads, with a thin coat of India-rubber in a pulpy state, which, penetrating into the interstices of the fibres, still further increases their adhesion, Mr. Goodyear is enabled to obtain extended surfaces of a species of resisting and waterproof paper—a real vegetable parchment of which he has been able to make excellent use in most advantageously superseding paper itself as a material for covering damp walls; as a material, moreover, very well adapted for printing upon, and therefore to the making of large maps for walls, also of the globes and celestial spheres of large dimensions which are employed in teaching cosmography or geography. By covering with this waterproof fabric a species of woollen wadding, he has been enabled to produce garments at once warm and waterproof, remarkable for their lowness of price, and especially for their lightness, which much surpasses that of the ordinary Mackintosh. By covering this same stuff, rendered adhesive, with cotton fabrics, he has been able to employ it in making table-covers. Made to adhere to a thick woollen down it can be employed to cover the ground in such a manner as to keep off cold and moisture, and constituting a new species of carpet which is beginning to be substituted in the United States for the floor coverings of oil-cloth used in low and damp places. Mr. Goodyear, by covering with two layers of a felt of this description the two sides of rough canvas, has been able to unite in this combination the advantages of impermeability with those of greater resistance to mechanical action, and thus economically to obtain cloths adapted to the manufacture of sails, and to the coverings of carriages and merchandize.

With this kind of complex stuff are made, at the present day in the United

States, the apparatus for life-boats, the insubmersible boats, as well as those pontoons inflated with air which were first constructed by Mr. Armstrong, of New York, and which, by simplifying certain equipages which the armies were compelled to carry with them, have already rendered service to the United States in their war with Mexico.

It is well known that the application of India-rubber to the manufacture of shoes was in a more especial manner the object of the first researches of Mr. Goodyear. These shoes are of three sorts. Those of one sort are formed of a layer of caoutchouc, covering a woven and non-elastic fabric: these common shoes appear to be universally employed in the United States. Others, produced by a layer of caoutchouc spread upon a knitted, and therefore an elastic fabric, are more commodious in use, their elegant shapes leaving nothing to be desired. This kind of fabric has also been made use of for the manufacture of gloves, which, proof against water, lyes, &c., allows the mistress of the house in humble families and her children to apply themselves to the most lowly household cares without giving up a certain degree of elegance, and without destroying the whiteness of the hands.

Mr. Goodyear has, in addition to these, exhibited a few specimens of a third species of shoe, of entirely new invention, which is made with a sheet of caoutchouc pierced through with an infinity of very small holes. These shoes, which by reason of the resistance of the India-rubber to moisture, and of the extreme smallness of the holes, are impermeable to water, but pervious to gases, possess the double advantage of being waterproof in regard to external moisture, while they nevertheless admit of the dissipation of the moisture arising from perspiration. This condensation of the moisture of perspiration is a serious inconvenience inherent at the present day in the wear of India-rubber shoes, and of the ordinary Mackintoshes. These inconveniences may be entirely removed, without the advantages being diminished, by the employment of the thin pierced sheets of India-rubber exhibited by Mr. Goodyear.

In the multiplicity of objects to which caoutchouc has been lately applied, it was proper that childhood should have its share. Mr. Charles Goodyear has conceived the happy idea of fashioning the mixture of sulphur and caoutchouc, constituting vulcanized India-rubber, by heating it in moulds. He is thus enabled to produce dolls' heads, different figures of animals—in a word, toys of every description, which are indestructible by falls, shocks, and moisture, and which, while contributing to the pleasures of childhood, only deprive it of that of destroying.

It has been already seen how Mr. Charles Goodyear had in America, since the year 1842, worked in caoutchouc, to which the addition of sulphur and carbonate of lead had imparted the greater elasticity. By combining caoutchouc with sulphur and magnesia he has latterly succeeded in imparting to it the rigidity and hardness of wood, but of a plastic wood, and therefore susceptible of being produced from moulds in the most varied forms. This material, like India-rubber itself, is capable of receiving different tints; and by partially mixing the differently coloured masses, he has been able to produce shaded specimens, which are beginning to be substituted for horn in the manufacture of buttons, and of handles for penknives and table-knives, and which rolled

out into thin sheets are adapted to take the place of wood in the veneering of furniture. Although this invention is as yet a recent one, there is good reason to suppose that it will very soon bear its fruits. By varying the preparations of sulphur and magnesia combined with the caoutchouc, it has already been made to attain different degrees of consistence; and probably in a short time industry will be able to discover in this substance, so indestructible, all the degrees of cohesion that solid matter exhibits in its most varied states. This enumeration of the articles shown by Mr. Goodyear at the Great Exhibition, incomplete though it is, nevertheless suffices to indicate the extent of the services which he has rendered to the art of applying India-rubber to the most diversified uses, and justifies the high distinction he has obtained, as well as the award which the Jury make to him of a Council Medal.

§ 3. *Prize Medals.*

1. THE HAYWARD RUBBER COMPANY, Colchester, Connecticut, United States (Off. Cat., 294). The manufacture of waterproof boots and shoes is one of the principal uses of India-rubber in the United States. The manufacturers who make them supply a consumption of from three to four million pairs every year. One single establishment, that of the Hayward Rubber Company, manufacture as many as 3,000 pairs a-day: they employ in it the process invented by Mr. Good-year. These boots and shoes have attracted the attention of the Jury. They possess the double merit of being well made and of elegant appearance. The considerable number in which they are made must have a tendency to lower their price. The Jury award a Prize Medal to the Hayward Rubber Company.

2. J. WANSBOROUGH, 52 Little Britain, London (Off. Cat., 75). Mr. Wansborough has exhibited a new description of waterproof fabric, produced by a method which calls to mind the manufacture of the stained papers called velvet papers. By covering an ordinary fabric of thread or cotton with a coat of glutinous caoutchouc, and then causing to adhere to it the wool powder coloured in different shades, which is so abundantly obtained in the shearing of cloth, he has been enabled to produce a fabric resembling velvet, which is strong and waterproof, and which, for the manufacture of travelling hats, curtains, travelling bags, &c., is capable of receiving numerous applications. The Jury have awarded Mr. Wansborough's invention with a Prize Medal.

3. S. C. MOULTON, New York (Off. Cat., 534). Mr. Moulton exhibits some articles in India-rubber prepared in England, principally by Mr. Goodyear's processes, and which have appeared to the Jury to be well made. They have particularly noticed some waterproof fabrics which Mr. Moulton exhibits as having been produced by machinery and without dissolving the caoutchouc, a method, the result of which is to obtain waterproof fabrics entirely free from the disagreeable smell which they often possess. Amongst the very numerous objects comprised in Mr. Moulton's collection, the Jury have especially noticed some half clogs, the same as those shown in the American Exhibition, but made with greater elegance, and which, being easy to put on with a common shoe, easy to take off, and of a tolerably low price, seem to exhibit the form in which these articles (the utility of which is every day better appreciated) may be best extended in Europe, and more generally employed there. The Jury have also noticed some

articles of saddlery which exhibit a new application of vulcanized India-rubber, in superseding the leather usually employed in their manufacture. The Jury award a Prize Medal to the *ensemble* of Mr. Moulton's manufactures.

4. GROSSMANN and WAGNER, 11 Rue de Renard St. Sauveur, Paris (Off. Cat., 856). India-rubber, which so much resembles leather in its properties, nevertheless lacks an essential quality which is one of the characteristics of leather, its tenacity. It will be understood, therefore, what great advantage would arise in uniting together two substances, the qualities which should in some degree complete each other. Amongst the different articles of Messrs. Grossmann and Wagner's manufacture which have attracted the notice of the Jury, they have remarked some shoes in which these manufacturers have realized this union. These shoes, the soles of which are of leather, possess greater durability than those which are entirely made of India-rubber, and have not the defect of slipping upon the pavement. The Jury have rewarded the manufacture of Messrs. Grossmann and Wagner, and especially the perfection to which they have brought India-rubber shoes, with a Prize Medal.

5. THOMAS FORSTER, Streatham, Surrey (Off. Cat., 178). Mr. Forster exhibits some waterproof garments of good make. These garments, in which the especial object has been to render them more accessible to the less opulent classes, are produced by means of the combination of ordinary caoutchouc with certain resinous substances, which are moreover added in suitable quantities so as not to interfere with the suppleness or the flexibility of the fabric. Mr. Forster produces articles in the coloured paste of India-rubber, which he was the first to bring into use. The good quality of these fabrics made by Mr. Forster has been proved by long use. The Jury award him a Prize Medal.

6. CHRISTOPHER NICKELS and Co., 13 Goldsmith Street, Cheapside, London (Off. Cat., 78). The manufacture of elastic tissues constitutes one of the most important uses of India-rubber. Messrs. C. Nickels and Co. devote themselves with much success to this special manufacture. They exhibit a collection of articles of this description proceeding from their factories, which show of how great a variety this species of weaving is susceptible. The elastic tissue serves no longer solely for the manufacture of garters, braces, and belts; it is applied to the manufacture of gloves, sandals, elastic cords, and other articles of the same kind, of which Messrs. C. Nickels and Co.'s exhibition contains a complete collection. The Jury award them a Prize Medal.

7. M. LEUNENSCHLOSS, Rouen (Off. Cat., 313). The manufacture of elastic tissues, which had its birth in France, has received in that country a great degree of development. It comprises the numerous fabrics of this description of productions, a few of which are represented at the Great Exhibition. The Jury have especially noticed the productions of this nature which are exhibited by M. Leunenschloss, and which are worthy of the reputation which this manufacturer has deservedly obtained. He is moreover the author of several ingenious inventions, which have rendered this manufacture more easy and regular. The productions which he exhibits in braces and laces for tailors' and ladies' use, are remarkable for their good quality and their elegance. The Jury award a Prize Medal to M. Leunenschloss.

8. Messrs. HÖLTRING and HÖFFKEN, Barmen (Off. Cat., 662). The collection

of braces exhibited by this firm presents a series of articles, in which the threads of elastic tissue are employed for one of their most useful applications. The workmanship and appearance of these articles also entitle them to commendation.

§ 4. *Honourable Mention.*

1. Messrs. BUNN and Co. (Off. Cat., 77). A very extensive and interesting collection of specimens of the various descriptions of India-rubber, more especially from Para. Also specimens of gutta percha, and examples of the processes to which these substances are submitted in their preparation for application in the arts.

2. W. H. BURKE (Off. Cat., Class IV., 115). Specimens of India-rubber web manufactures of various kinds. These consist of tissues of alpaca, mohair, and Genappe braids, covered with caoutchouc on one side, and having a peculiarly light and elegant character. The exhibition comprises also specimens of "mineralized India-rubber," having the same properties as vulcanized India-rubber, and prepared with the object of avoiding the smell of the sulphur used in its preparation.

3. Messrs. CHURCH and CHITTENDEN, United States (Off. Cat., 382). A collection of shoes made of India-rubber, in a style which enabled the makers to sell them at a low cost. This is one of the establishments in America registered under Mr. Goodyear's patent.

4. J. C. CORDING, United Kingdom (Off. Cat., 82). A variety of articles of dress made of various fabrics, and rendered waterproof by caoutchouc. The articles included coats which might be worn with either side outwards, also ladies' capes and hoods.

5. R. E. HODGES, United Kingdom (Off. Cat., 72). Various applications of the elastic property of vulcanized India-rubber, as in mechanical purchases, guns, bows, &c.

The Reporter would also call attention to the caoutchouc manufactures exhibited by Mr. J. HORSEY, of London, and not placed in the Official Catalogue, which contained several very elegant specimens of goods manufactured from vulcanized India-rubber, as also fabrics coated with caoutchouc of various colours, in which the colours were mixed with the caoutchouc and not subsequently applied, so as to prevent their being removed by wear or the application of moisture.

The ladies' and children's boots and shoes exhibited by Mrs. TALLERMAN (Off. Cat., 70), afford an instance of a new and useful application of caoutchouc.

§ 5. *Remaining Exhibitors.*

Under this head the Reporter has endeavoured to give a list of the names of exhibitors of various articles made of caoutchouc, or into which it enters, whether exhibited in Class XXVIII., or belonging to some other.

J. SANDERS, 11, Fore Street, Cripplegate (Off. Cat., 73). India-rubber waterproof umbrella tent.

J. L. HANCOCK, Goswell Mews, Goswell Road (Off. Cat., 83). Portable India-rubber shower-bath, hose reel, and inflated air-tight bed chair.

S. MATTHEWS, 58 Charing Cross (Off. Cat., 81). Large-sized India-rubber

portable boat, and India-rubber cloak boat, designed by Lieut. Halkett, R.N. India-rubber portable bath.

C. JOUBERT, 8 Maddox Street, Hanover Square (Class XX., Off. Cat., 40). Self-adjusting white watered corset. Elastic corset belt for invalids. India-rubber tissue, of French manufacture.

J. S. HALL, 308 Regent Street (Off. Cat., 184). Improved elastic over-shoes, with leather soles and plush heels, to prevent slipping.

S. TURKER, Orchard Place, East India Docks (Off. Cat., 223). Coal and its products. Products from caoutchouc and wood.

J. OUTRIDGE (Off. Cat., 29). Caoutchouc from River Demerara, near the Falls. Milk from the cow-tree, from River Demerara.

W. HUET, Rouen (Seine-Inférieure), and 12 and 14 Rue du Cimetière, St. Nicholas, Paris (Off. Cat., 270). India-rubber articles, braces, and twists.

J. D. LEBLOND, Carver, 5 Rue St. Louis (au Marais), Paris (Off. Cat., 297). Patent India-rubber male and female figures for artists.

C. L. DUCOURTIOUX, Caoutchouc Stocking Manufacturer, 4 Rue Fontaine au Roi, Paris (Off. Cat., 1199). Machine-made caoutchouc stockings and belts.

BRIQUET and PERRIER, Tissue Manufacturers, 22 Rue Jean Robert, Paris (Off. Cat., 1116). Elastic caoutchouc tissues for braces, garters, &c., and specimens of that manufacture.

— RABOURDIN, Manufacturer, 88 Rue des Marais St. Martin, Paris (Off. Cat., 1416). Braces; garters; silk and India-rubber fabric.

— LERKHE, St. Petersburg (Off. Cat., 311). Clogs in India-rubber, for ladies and gentlemen. Waterproof morocco pillow.

H. H. DAY, New York (Off. Cat., 308). India-rubber manufactures.

J. J. ROMPLER, Erfurt (Off. Cat., 781). India-rubber elastic braces and watch-guards. Silk and half-silk shoe stuffs, mixed with India-rubber; shoes made of the same material.

ROOYACKERS and SON, Rotterdam, Makers (Off. Cat., 52). Boots; varnished boots, the leg without seam. A Chinese boot. Boots of vulcanized caoutchouc.

LOUISA PIERCE, Geneva (Off. Cat., 233). Caoutchouc knit stockings for invalids.

J. VIE, Caoutchouc Manufacturer, 161 Rue St. Jacques, Paris (Off. Cat., 726). Caoutchouc tissues, elastic stockings, belts, knee-caps, &c.

SECTION B.—MANUFACTURES FROM GUTTA PERCHA.

§ 1. General Remarks.

The substance designated by the name of gutta percha (pronounced *pertsha*), is, like caoutchouc, a carburet of hydrogen, and isomeric with that substance, and possesses a great number of the properties which characterize India-rubber, but exhibits certain special properties which admit of its being applied to particular uses to which caoutchouc is not adapted. Gutta percha possesses as great an indestructibility by means of chemical agents as caoutchouc. It has an intermediate consistence between that of leather and wood; it is capable of being softened by heat, and of regaining its primitive consistence on cooling. It is, therefore, at the same time capable of taking and of retaining the most delicate

impressions. The important uses to which it has been latterly applied are only the forerunners of those to which it will be adapted hereafter, provided the lack of this precious material (which unfortunately is produced in much less quantities than India-rubber, and in localities much more circumscribed) does not present an obstacle to it.

Whilst the plants which furnish caoutchouc abound in the whole of the territorial zone which extends between the tropics, the *Isonandra gutta*, belonging to the natural order *Sapotaceæ*, is the only tree which yields gutta percha. It grows scarcely anywhere except in certain parts of the Malayan Archipelago, and up to the present time has been almost exclusively obtained from Singapore. It was brought for the first time into England, in the days of Tradescant, as a curious product, under the name of *Mazer wood*, and subsequently it was frequently brought from China and other parts of the East, under the name of India-rubber, in the form of elastic whips, sticks, &c. In 1843 Doctors D'Almeida and W. Montgomery drew particular attention to it, together with its various singular properties, its easy manipulation, and the uses for which the Malays employed it. The most common employment of it was for whips: and it was by the introduction of a horse-whip made of this substance that its existence was for the first time known in Europe. The exhibition of the products of the East Indies, shown by the Honourable East India Company, proves that the natives of the country in which the *Isonandra gutta* grows, knew also how to appropriate it to the manufacture of different kinds of vases, and that European industry has little more to do than to imitate their processes.

The importation of gutta percha into England, where the employment of this substance first drew attention, was in 1845 only 20,600 lbs.; but in 1848 it had increased to above 3,000,000 lbs.; and during the last three years the importation has amounted to a much larger quantity, and one which begins to cause some apprehension as to the possibility of the supply sufficing for the requirements of the novel uses in store for it in the future. It is true that during its use gutta percha is but little consumed, and the waste from the articles in this material, submitted to a proper softening, can be made to serve new uses; nevertheless its constantly increasing consumption, added to the barbarous manner in which the product has hitherto been extracted, may well justify some apprehension.

During the first few years of the employment of gutta percha it was the custom to cut down the tree for the purpose of obtaining the juice, which, left to itself, very soon allowed the gutta percha to separate and coagulate of its own accord. There is reason to hope that European industry will soon be embarked in the cultivation of this product, and that the *Niato* (which is the name that the Malays give to the tree which produces gutta percha), multiplied by means of a regular culture, naturalized in other countries than those to which it is indigenous, and worked by regular incisions, which will only take from the tree a portion of its juice without hindering its development, will be the means of furnishing at a low price a substance which is destined to render notable services to industrial and domestic economy.

The gutta percha, which arrives in Europe in the form of lumps of some pounds weight, is far from being pure. The natives of the Malayan Archipelago

make no scruple of introducing into it stones, earth, &c. ; the presence of which in the interior of these blocks renders a purification indispensable, which purification, however, is capable of being attained without much manipulation.

Ever since its first introduction into Europe, gutta percha has, in fact, found everything provided for the purpose of cleansing it, and has been found capable of being worked by the processes and instruments which are employed in the purification of India-rubber. At the present day the block of gutta percha, cut into slices by a strong machine, is softened by means of hot water, divided and torn into shreds by the same machine that is used for India-rubber, which serves to knead the gutta percha in such a manner that the crushed stones and earth may be separated from it on being diluted in the water ; it is then dried, and submitted, by means of a powerful machine, to a mastication similar to that which India-rubber is made to undergo ; and when, after some hours of kneading, the mass has become homogeneous and sufficiently softened, it is drawn by the drawing-mill into cylindrical cords, into tubes of various diameters, or it is spread out by means of the flattening machine (as is done with lead) into sheets of various thicknesses, which are finally divided into bands, from which are cut out with a nipping tool the pieces which are required to be employed in different uses.

Whatever difficulty manufacturers may have had in procuring gutta percha fit to be made use of, they have at least been able to concentrate their efforts upon the discovery of uses to which it is adapted ; and in the space of a few years have discovered numerous and important ones, as may be witnessed in the beautiful exhibition made by the Gutta Percha Company. One of the first and principal uses of gutta percha was to supersede the leather bands employed in machinery for the transmission of movements. This is very nearly the only use to which it has hitherto been applied in France. It seems, moreover, that latterly in England some inconveniences have been found to result from this employment of gutta percha ; but should its use for that purpose diminish, every day others are found for it.

Indestructible by water, and at the same time a bad conductor of electricity, gutta percha has been found available for enclosing the metallic wires employed in the electric telegraph ; and the use of this substance may certainly claim its share in the success of the submarine telegraph, which has just brought London and Paris within a few minutes of each other.

It may be conceived to what a variety of forms a substance can be turned which, becoming soft without adhering at the temperature of boiling water, regains at the ordinary temperature the slight elasticity and the consistence of leather. Thus agriculturists and manufacturers have turned it to account for the fabrication of buckets of all kinds, light, indestructible, and capable of being mended by a slight degree of heat and pressure when they are worn out.

It is especially in the manufacture of articles for maritime use that gutta percha, resisting as it does the action of water, and especially of salt water, appears to be the best adapted. Buoys of every description for anchors, nets, &c., have been made of it ; sailors' hats, speaking-trumpets, &c. There is no doubt that it will be brought to perform a useful part in waterproof garments, as well as in the construction of life-boat apparatus. If India-rubber has been advantageously

combined with leather, it may be conceived that the combination of gutta percha with wood, of which Mr. Forster has shown a specimen at the Exhibition, may in certain cases offer peculiar advantages.

The decorative art has also taken advantage of the plastic properties of gutta percha. All those different articles of furniture, the prices of which are so much enhanced by carving, are capable of being reproduced by means of pressure, and thus multiplied at a low price. Writing-tables, work-baskets, &c., can be produced in gutta percha, and thus be made to combine the threefold advantage of lowness of price, elegance of form, and absence of fragility. In the large manufactory which is more especially devoted to the employment of gutta percha, are made every day a great quantity of mouldings, friezes, panels, leaves, &c., and of articles of every description. These, combined by the decorator, covered with gilding (which gutta percha takes in perfection), are, in the manufacture of picture-frames, and in the decoration of furniture, capable of superseding the carving upon wood, which is so costly, or papier-maché and carton-pierre, which present the defect of great fragility. On going through the exhibition of Messrs. Thom and Co., as well as that of the Gutta Percha Company, we may judge of the extent which the employment of this substance promises to the decorative art by the imitation of carving upon oak, rosewood, &c. Bronze articles have also been reproduced in a felicitous manner; and the clearness of the edges and the purity of the forms make it easy to understand how gutta percha has been found capable of being used for making galvano-plastic moulds, and how some experiments have begun to be tried for the purpose of substituting this material in the process of stereotyping, for the metal with which at the present day the pages of our illustrated books are multiplied. This employment of gutta percha for the reproduction, by pressure, of objects for interior decoration cannot but be widely extended, enabling the many to enjoy those graceful and elegant forms which, as long as they could not be reproduced in a material indestructible by water and free from fragility, could only be brought within the reach of the few.

Quite recently, by the exertions of Mr. Truman, a lump of coloured gutta percha, moulded into the form of a jaw-bone, has been found capable of holding together artificial teeth, and thus advantageously superseding those settings in gold, which were so costly, and the absolute rigidity of which, moreover, presented much inconvenience. The slight but sensible elasticity possessed by gutta percha renders it, on the contrary, very well adapted to this use.

There is another use to which the exertions of H. Mapple have rendered gutta percha applicable. Soles of this substance, glued on to the upper leathers by means of gutta percha dissolved in gas-tar, constitute shoes which are not affected by water, which will last a long time, are very simple and economical in their make, the soles of which are easily mended, and easily put on again when they come off, and can be made to serve anew by means of a fresh kneading up when they have become unfit for use; thus constituting a description of shoes, the use of which cannot fail to become extended in such a general manner as to render notable service to health. Gutta-percha soles have also been found capable of being affixed with much advantage upon leather soles.

This solution of gutta percha in the oil of tar, like that of caoutchouc, which, by its evaporation, leaves the caoutchouc uninjured, can be made use of to obtain

sheets of gutta percha of extreme thinness, which have already begun to be used in surgery, as well as in the preparation of waterproof papers and cloths.

It is more especially to the manufacture of chemical utensils for the preservation and conveyance of acids, that gutta percha seems destined to render the greatest services. Latterly pumps for hydrochloric acid have been made of it, pipes for conveying this acid, bottles in which to send it away; large wooden vessels have been lined with gutta percha, in which to preserve the acid; gasometers are being constructed, which will be capable of collecting the sulphuric acid disengaged in certain chemical actions, and which would have corroded metallic vessels.

§ 2. *Council Medal.*

THE GUTTA PERCHA COMPANY, Wharf Road, City Road (Off. Cat. 85). A great number of the novel applications of this substance have been invented by the Gutta Percha Company; and the great development which this Company has given to this branch of industry has realized all that could be hoped from the employment of this substance. The exhibition also of specimens was very complete and extensive. The Jury, therefore, recommended that one of its great rewards should record their sense of exertions which have in a few years shown in so striking a manner the extent to which this new substance may be made available for the benefit of man, as well as the means by which it may be successfully employed. The Jury have, therefore, awarded a Council Medal to the Gutta Percha Company, as having, in the highest degree, contributed to these important results.

§ 3. *Prize Medal.*

THE WEST HAM GUTTA PERCHA COMPANY (Off. Cat., 90). In the distribution of the awards of which gutta percha is the object, the West Ham Gutta Percha Company cannot be overlooked. They have also submitted to the judgment of the Jury the most varied objects manufactured in gutta percha, in which they have made use of certain processes peculiar to Mr. Charles Hancock.

A beautiful group, representing a boar hunt, covered with a metallic coating in imitation of bronze, displays in a very high degree the success with which gutta percha may be employed in the decorative and even fine arts. The exhibitor has succeeded in combining gutta percha with sulphur and the metallic sulphurets, to which the name "metallo-thianised" gutta percha has been employed. The gutta percha thus treated is as hard as ebony, and can be used for most purposes to which wood and ivory are generally applied.

§ 4. *Honourable Mention.*

J. MARTIN CABIROL, Paris (Off. Cat., 786, France). The Jury think it right to record their sense of the merit of M. Cabirol's application of gutta percha to the manufacture of surgical instruments and apparatus, although the consideration of the merit of the particular object belongs to another class.

§ 5. *Other Contributors.*

F. WHISHAW, 9 John Street, Adelphi, Designer and Inventor (Off. Cat., Class X., 419.) Telekerephona, or speaking telegraph. Gutta percha telephone.

Railway trains communicator. Gutta percha tube and lathe-band, as first made at the Society of Arts in 1845. Subaqueous insulated electric telegraph conductors. Battery protector.

MARY O'DONNELL, 69 London Street, Reading, Designer (Off. Cat., Class IX., 53). Ornamental leather. Hand-screens in stamped gutta percha, preserved real flowers and embroidery, &c.

THE GUTTA PERCHA COMPANY, Pat., 18 Wharf Road, City Road (Off. Cat., Class XXVI., 21). Table and pier glass in gutta percha ornament, in the natural colour.

F. THOMPSON, Westfield Terrace, Sheffield, Inventor and Manufacturer (Off. Cat., Class XXII., 808). Patent gutta percha skates of various colours and combinations.

THORN and Co., 98 New Bond Street, Designer and Manufacturer (Off. Cat., Class XXVI., 1). Gutta percha manufacture. Decorations; girandole; various specimens and patterns of frames, brackets, mouldings, &c.

T. WALKER, 1 Conduit Street, Regent Street, Inventor and Manufacturer (Off. Cat., Class XXVIII., 87). Gutta percha hat-bodies. Ventilated velvet hats, &c. Hat-case, answering for a life-buoy float, foot-bath, &c.

Miss MOORSON, Kensington (Off. Cat., Class XXIX., 253). Gutta percha models.

W. T. ILIFF, Newington (Off. Cat., Class XXIX., 253A), "London Street Scenes," "May Day," &c., modelled (by the hand) from gutta percha, by Miss E. Moorson, of Kensington, aged 13.

F. DINZI, Vienna, Manufacturer (Off. Cat., 348). Gutta percha articles, including sticks, riding-whips, snuff-boxes, goblets, flower-pots, &c.

T. WHEELER, Toronto (Off. Cat., 353). Medallion in gutta percha of the Earl of Elgin, Governor-General of Canada.

SECTION C.—MANUFACTURE FROM IVORY, TORTOISESHELL, SHELLS, BONE, WHALEBONE, HORN, BRISTLES, &c., CORK, COCOA-NUT FIBRE, VEGETABLE IVORY, &c.

The articles manufactured from the above substances, and not included in other sections, are not numerous, but are of a very miscellaneous character; it is therefore, almost impossible to give any connected account of them. Many of these materials were exhibited as raw products in Class IV., as ivory, whalebone, cork, &c., and to the Report on this section the reader is referred for their natural history. Such substances as ivory, bone, and horn, enter into the manufacture of many articles of use which have been referred to in the Reports on previous sections. The articles exhibited in this section will be referred to under each separate substance mentioned, and as near as possible under the heads before employed.

I. ANIMAL SUBSTANCES INCLUDED IN SECTION C.

1. *Ivory.*

This substance, obtained chiefly from the tusks of the elephant, of which a great variety were exhibited in Class IV. formed a conspicuous object in many parts of the Exhibition. Many of the articles formed of ivory which were exhibited dis-

played those qualities of taste and design which, although some were intended for use, removed them from the Class which contemplated objects of utility, and placed them for examination under the Jury of the Fine Arts. Such were many of the specimens of ivory carving exhibited by the Hon. East India Company. The grotesque carvings of the Chinese, as well as busts and statues in ivory, were all thus placed beyond the jurisdiction of the Jury of Class XXVIII. The principal applications in ivory brought before this Class were delicate veneers, combs, and work inlaid with ivory.

Prize Medals.

THOMAS STAIGHT, 12 Walbrook, Manufacturer (Off. Cat., Class IV., 109). Specimens of turning and carving in ivory. Many of the objects exhibited were beautifully executed. A set of ivory chessmen, representing Crusaders, was especially deserving of notice. There were also specimens of carving in pearl deserving of commendation.

STAIGHT, D., and SONS (Off. Cat., Class XXIX., 252). Specimens of ivory veneering and other manufactures in ivory of a useful kind.

J. PRATT and Co., Meriden, Connecticut, United States, Inventor. This Company exhibited specimens of ivory veneer cut by machinery. These veneers were exceedingly delicate, one piece alone, 12 inches in width and 40 feet in length, having been sawn from a single tusk. The machine by which this veneer was produced was an invention of the exhibitors.

JOHN FENN, New York, United States, Manufacturer (Off. Cat., 111). An exhibition of several articles manufactured from ivory. The workmanship was very superior. The comb exhibited contained 150 teeth in the inch.

NOEL, sen., 33 Rue de Lancry, Manufacturer (Off. Cat., France, 666). A large collection of well-manufactured ivory combs with hollow round teeth.

AUGUST HABENICHT, (Off. Cat., Vienna, 376). Amongst a number of articles for fitting up dressing-cases and for the toilet-table were some beautiful ivory combs.

LUDWIG GEISMAR and Co., Weisbaden, Nassau (Off. Cat., 13). A cup in ivory, with figures in alto and basso relievo, the subject being Christ blessing the Children; also brooches and bracelets in ivory, carved with much taste.

LOUIS JOSEPH MASSUE, 3 Rue Aumaire, Paris, Manufacturer (Off. Cat., 615). A large assortment of well-manufactured ivory combs.

— WOLF, 2 Rue St. Appoline, Paris (Off. Cat., 744). Specimens of ivory carved in various forms.

HOLTZAPFEL and Co., 64 Charing Cross, and 127 Long Acre, Manufacturers (Off. Cat., Class VI., 252). The Jury had their attention called to the beautiful specimens of ivory turning exhibited by this Company in the department devoted to the exhibition of machinery, where they were exhibiting their turning apparatus. They were specimens of plain and ornamental turning, but some of a very superior kind.

H. WILLIAMS, Dublin, Inventor (Off. Cat., 163). Eccentric ivory turning without eccentric chuck.

C. SHAW, Mount Street, Dublin, Producer (Off. Cat., 164). Specimens of mechanical sculpture in ivory

JOHN MAUNDER, Launceston, Cornwall (Off. Cat., 28). A miniature dessert set turned in ivory.

In determining on the prizes in ivory work the Jury had some difficulty in ascertaining whether particular specimens belonged to their department, especially in the case of carving, in which case so many of the objects came under the Class of Fine Arts. Other exhibitors in ivory in Class XXVIII., to whom prizes were not awarded, were as follows:—

PETER JOHNSON, Wigan, Manufacturer (Off. Cat., 15). A collection of fancy articles, many of which are turned in ivory.

E. CRUMMACK, York, Proprietor and Manufacturer (Off. Cat., 18). A collection of ivory combs made by hand.

WALTER TRUEFITT, 1 New Bond Street (Off. Cat., 65). Carved ivory brushes and combs.

OSCAR SMITH, 21 King Street, Covent Garden, Manufacturer (Off. Cat., 95). Specimens of ivory turning and carving.

G. GARRETT, 1 Victoria Terrace, Woodbridge Road, Ipswich, Manufacturer (Off. Cat., 141). Ornamental snuff-boxes turned in ivory.

W. D. KEMPSHILL, Clonmel, Ireland, Designer and Manufacturer (Off. Cat., 158). A variety of specimens of turned and carved ivory.

JOHN FRANCIS KAIN, 27 Brownlow Road, Dalston, Inventor and Manufacturer (Off. Cat., 45). A full-sized bird-cage made principally of ivory.

2. *British Ivory.*

This substance was exhibited by Mr. HENRY BROWN, of 187 Whitechapel Road (Off. Cat., 49), and on account of its being likely to turn out an important and valuable discovery, and in many cases calculated to supersede real ivory, the Jury awarded a Prize Medal to the inventor.

3. *Tortoiseshell and Horn.*

Tortoiseshell, which is obtained from several species of the reptilian order *Tes- tudinata*, but the best specimens more especially from the hawkbill turtle (*Tes- tudo imbricata*), enters into the composition of many articles found in other classes of the Exhibition. It is employed in the manufacture of workboxes, clock-cases, ten-caddies, cabinets, card-cases, spectacle-frames, and other things. It is also employed in the manufacture of combs, and these articles of use were exhibited in Class XXVIII. For whatever purposes employed, the tortoiseshell is prepared in the same way. The part of the tortoise called the shell exists as a layer of cellular gelatinous matter on the surface of the external skeleton. This substance is separated from the osseous foundation on which it rests, by the application of heat. For this purpose the whole shell of the tortoise is exposed to the action of heat till the epidermal plates start from the bone beneath, and the final separation is effected by a long knife. The tortoiseshell, which is represented by the epidermis in other animals, is mainly composed of a substance resembling gelatine in its chemical character, and a small quantity of inorganic matter. On examination under the microscope it is found to consist of cells, which are naturally compressed, but may be made to assume a spherical form under the influence of a solution of potash and heat. On the application of heat the tor-

toiseshell becomes softened, and in this state may be compressed into any form required for manufacture. Sheets are thus prepared which, when cooled and cleansed, are submitted to machinery, by which they are cut into combs or other articles of use. No new or remarkable application of this substance came under the notice of the Jury. The collection of objects, however, exhibited by RICHARD PETERS and SON, of Birmingham (Off. Cat., 131), and referred to another class, afforded several instances of the uses of tortoiseshell.

Horn is employed for all the purposes of tortoiseshell, and its much greater cheapness gives it a more extended application. Knife-handles, buttons, umbrella-handles, whip-tops, bell-pulls, drawer-knobs, sides of lanterns, besides all kinds of combs, are some of the purposes to which this useful substance is applied. In manufactures from horn that substance is chiefly obtained from the ox, although the tips, and even the whole horns of other animals, as of the ram, the antelope, the buffalo, the deer, are employed for special purposes. Among the imports into Liverpool in 1850 were the following:—

						Tons.
Deer horns	-	-	-	-	-	280
Buffalo horns	-	-	-	-	-	200
Buffalo tips	-	-	-	-	-	120
Ox and cow horns	-	-	-	-	-	700

The latter were brought principally from South America, where they are obtained from the wild oxen of the Pampas. Horn, like tortoiseshell, is composed of a gelatinous matter with inorganic salts. Under the microscope it is seen to be composed of cells, which indicate its epidermal character, in common with the matter of which the nails, claws, hoofs, and hair of animals is composed. The horn which is used is developed around a vascular substance, which projects into the interior of the horn, and which is removed by steeping in water. In its preparation for manufacture, horn is exposed first to the action of boiling water, then of heat, under which it becomes softened, and may in proper moulds be made to assume almost any form. One of the best collections of articles in horn-work exhibited in the Crystal Palace was that sent by the SULTAN OF TURKEY, and the Jury accordingly awarded to his Highness a Prize Medal.

The following Prize Medals were also awarded for combs and articles of ornament manufactured in both tortoiseshell and horn.

E. CREMMACK, York, Proprietor and Manufacturer (Off. Cat., 18). Tortoiseshell and horn dressing-combs.

FAUVELLE-DELABARRE, 10 Bouvelard Bonne Nouvelle, Paris (France, Off. Cat., 202). Tortoiseshell and buffalo-horn combs.

PHILIP, Passage Choiseul, Paris (France, Off. Cat., 680). Bracelets, brooches, and ornaments in tortoiseshell.

POINSIGNON, —, 23 Rue Neuve St. Martin, Paris (France, Off. Cat., 1397). Imitation tortoiseshell combs.

J. and J. STEVENSON, Sheffield, and 9 Cripplegate Buildings, Wood Street, London (Off. Cat. 152). Ornamental, dress, and other combs, of ox and buffalo horns.

A. A. TRANCART, 12 Rue Neuve St. Denis, Paris (France, Off. Cat., 393). Tortoiseshell combs.

4. *Mother-of-Pearl.*

An extensive assortment of mother-of-pearl ornaments, consisting of medallions, pen-holders, needle-cases, thimbles, &c., exhibited by J. SCHWARZ, of Vienna (Off. Cat., 684), and a collection of black and white pearl buttons by J. CHATWIN and SONS (Class XXII., 286), of Birmingham, were the only articles brought under the notice of the Jury of this Class, and Prize Medals were awarded to each for the superior workmanship they exhibited.

5. *Shells.*

But few examples of the use of shells for cameos were seen in the Exhibition. A Prize was awarded to a collection exhibited by N. JULIN, of Belgium (Off. Cat., 383).

Shells are frequently worked into the form of baskets, vases, &c., and are made to imitate flowers. This kind of work forms a considerable branch of industry in the West India Islands, in the Channel Islands, and in the Mauritius. Prizes were awarded for this kind of industry to the following:—

Messrs. BALKFIELD and Co. (Off. Cat., Mauritius, 5).

The Misses GREIG (Off. Cat., Bahamas).

GREY, The Countess of (Off. Cat., Mauritius, 1).

Miss NICOLLS (Off. Cat., Bahamas).

In the collection of the Honourable East India Company were interesting specimens of bracelets and necklaces from Dacca. The construction of these ornamental objects employs a large number of persons. They are made from transverse slices of the *Turbinellus scolinus*, and are often ornamented with metallic studs, or carved with various devices.

6. *Whalebone.*

This substance is extensively employed in the arts, and was exhibited in its raw state in Class IV., and in various other Classes. Its manufacture for the purpose of covering whips, telescopes, and other instruments, and in thin strips for plait used in making bonnets and other articles of dress and use, came before the Jury of Class XXVIII., and the following Exhibitors were awarded Prize Medals:—

H. HORAN (Off. Cat., Class IV., 103).

WESTALL and Co. (Off. Cat., Class IV., 104).

7. *Bristles.*

Brushes of all kinds made from bristles were rewarded in the collections by the following Exhibitors:—

Prize Medals.

H. M. ENGELER and SON (Off. Cat., Prussia, 242). Painting brushes.

J. FINO (Off. Cat., Sardinia, 77).

G. FORSE (Off. Cat., Prussia, 813). Hall brushes instead of mats.

F. A. FRINNEY (Off. Cat., 181).

E. LAURENÇOT (Off. Cat., Franco, 1296).

C. L. LONCKE-HAEZE (Off. Cat., Belgium, 430).

G. PATTÀ (Off. Cat., Austria, 350).

A. SMITH (Off. Cat., 55A). Painting brushes.

H. SOMZÉ (Off. Cat., Belgium, 265).

Honourable Mention.

A. DOW (Off. Cat., 29).

L. F. FAUQUIER (Off. Cat., France, 502).

J. G. HINDE (Off. Cat., 196).

P. PAILLETTE (Off. Cat., France, 1377).

8. *Hair.*

Besides the uses to which the hair of animals is applied, and which are noticed by other Classes, the Jury have had brought before them a collection of bowls, dishes, plates, &c., formed of the hair of the rabbit, hare, and other animals, which are felted, and afterwards varnished. These utensils have the appearance of papier maché, or varnished leather, and possess the properties of being strong, durable, and very light. This manufacture is carried on principally in Russia, and a Prize Medal has been awarded to T. BARDOFFSKY (Off. Cat., Russia, 265) for a collection of those articles.

9. *Porcupine Quills.*

Allied in their production to bristles and hairs are the quills of the porcupine. In the Canadian collection were several examples of articles of clothing and furniture ornamented with these quills, obtained from the North American porcupine. The quills are dyed, and the colours appear to be durable; and this use of them seems to be new, and worthy of imitation in Europe. A chair and other articles, thus ornamented, were exhibited by Mr. W. DUNN, of Quebec (Off. Cat., Canada, 119), and by Mr. R. MARSHALL, to whom Prize Medals were awarded. Several articles of dress, ornamented in this manner, were exhibited.

10. *Quills of Birds.*

Goose and other birds' quills are found in other Classes; but two applications of this material came before the Jury. In the first instance, E. R. RIGBY (Off. Cat., 58) exhibited a collection of brushes made from split quills, which seemed to possess the qualities of cheapness and durability. The next instance was the application of the split quill to the making of children's caps and bonnets, and other articles of dress, also baskets, by J. C. F. BADIN (Off. Cat., France, 1063). Both these Exhibitors were deemed worthy of a Prize Medal.

11. *Silk-worm Gut.*

This substance, used by the angler, and generally supposed to come from China, is manufactured in Spain, and the specimens exhibited from the province of Murcia, in the Spanish collection (Off. Cat., 199), were deemed worthy a Prize Medal. (Awarded a Prize Medal by Jury of Class IV.)

II. VEGETABLE SUBSTANCES INCLUDED IN SECTION C.

1. *Cork.*

Specimens of this substance in a raw condition, the produce of the cork oak (*Quercus suber*), were exhibited in Class IV. Many of the applications of cork found a place in this Class. The most interesting of these was that exhibited by Messrs. ESDAILES and MARGRAVE (Off. Cat., 125), in which various uses were made of cork which had been veneered or cut into fibres. The following is the description of the specimens of this article exhibited, and which the Jury have deemed worthy a Prize Medal.

Case No. 1.—1. Specimens of finished hats, made of cork, with the vendors' names, and the respective weights.

2. Specimens of cork-hat bodies, or foundations, made solely of cork.

3. Specimen of a cork-hat body, or foundation, strengthened by muslin, as generally made and used by the trade.

4. Specimens of cork plates, cut by steam machinery, varying from 50 to 120 plates in the inch, in the state in which they are supplied to the hat-body makers.

5. Specimens of cork-tip pieces, of the like nature, in the state in which they are supplied to the hat-body makers.

6. Specimens of cork-hat cylinders, partly prepared and made up, in the state in which they are supplied to the hat manufacturers.

7. Specimens of cork-hat brim plates, in the state in which they are supplied to the hat-body makers.

8. Specimens of cork-hat brims, partly prepared and made up, as supplied to the hat manufacturers.

9. Specimens of printing on cork plates, with type and engraved blocks, exhibited by Mr. A. J. Mayer, inventor of the steam machinery employed at the City Saw Mills in this trade.

Case No. 2.—Fibre cut from cork by steam machinery, in its prepared condition, for the stuffing of ships' mattresses and boat cushions, to be used at sea for the preservation of life.

Case No. 3.—1. Specimen of a sea mattress, partially stuffed with cork fibre.

2. Specimen of the same, finished.

3. Specimen of a circular bolster, similarly stuffed.

4. Specimen of the application of cork fibre, applied as a packing to the stuffing-boxes of steam-engine piston-rods, and which is said to require no lubricating material.

Case No. 4.—Floating models, illustrative of the mode of using the cork fibre mattresses and bolsters as life-preservers at sea.

To the following Exhibitors Prize Medals were awarded for general manufactures in cork, as well as the excellence of the manufacture of cork for the ordinary use of stopping bottles, casks, and other vessels:—

DUPRAT and Co. (Off. Cat., France, 492).

GERONA, THE PROVINCE OF (Off. Cat., Spain, 189).

J. GUINART (Off. Cat., Spain, 188).

2. Vegetable Ivory.

This substance is the albumen (perisperm) of the seed of a small species of palm growing in the valleys of the Andes, whence it is now imported in very considerable quantities into this country. Humboldt first drew attention to its hardness and whiteness, and the uses to which it is employed by the natives of the districts in which it grows. It is called the "niggers'-head tree," on account of the form and size of the large black drupaceous fruit in which the seeds are contained. The fruit consists of several cells, in each of which is contained four seeds. The seeds are covered by a tough fibrous testa, which, on being removed, exposes the albumen, which represents the soft meat of the cocoa-nut and the seeds of other palms. At one end of the seed is a little cell, in which is enclosed the embryo, which seems to germinate without effecting any change in the condition of the hard mass by which it is surrounded. This is not the only palm whose seeds are hard enough for the uses of the turner, although the only one which is employed extensively for this purpose. The botanical name of the plant yielding these seeds is *Phytelephas macrocarpa*, and the order to which it belongs is that of *Palmææ*. It is a good substitute for ivory, where appearance and durability are not principal objects. Its whiteness soon becomes tarnished, and it wears when used for articles where much friction is required. The only articles made from this substance, exhibited in Class XXVIII., were those of Mr. BENJAMIN TAYLOR (Off. Cat., 47), which consisted of a variety of objects turned with great skill, and for which a Prize Medal was awarded.

3. Cocoa-nut Fibres.

The seeds of the cocoa-nut palm (*Cocos nucifera*), so well known by the name of "cocoa-nuts," are contained in a large fruit or husk, which is composed of long solid woody fibres. The natives of Ceylon and India have long made use of these fibres for weaving various coarse fabrics; but although cocoa-nuts were brought to this country enclosed in this shell, it has not been till recently that they have been manufactured in great Britain. They are now used for cordage, matting, brushes, and other purposes, to which the woody fibres of other plants, and even the bristles of animals, have been applied.

Prize Medals were awarded to the two following Exhibitors:—

T. TRELOAR (Off. Cat., 39). Samples of mattings made of cocoa-nut fibre (patterns provisionally registered). The same, with an admixture of Manila hemp. Door-mats of cocoa-nut fibre. Hearth-rug of the same. Mattress of patent curled cocoa-nut fibre. Brushes and brooms, various, all filled with the fibre. Specimens of cocoa-nut-fibre plait. Bonnet and hat made of the plait. Specimen of seating or fine cloth of cocoa-nut fibre.

WILDEY and Co. (Off. Cat., 40). Specimen of manufactures from the fibre of the outer husk of the cocoa-nut, consisting of floor-matting, plain and coloured; door-mats; netting for sheep-folds and other uses; hassocks; nose-bags for horses. Cocoa-nut husk; fibre from the same; fibre prepared for brushes, substitute for bristles; fibre curled, substitute for horse-hair mattresses; fibre dyed; yarn spun from fibre; cordage, from fibre; curling and spinning by machinery, and patent preparation of fibre from the husk.

The use of cocoa-nut fibre for bedding presents many advantages; it does not become knotty or hard, it does not harbour vermin, and it is not affected by variation of climate; it is also recommended by the great cheapness at which it can be produced.

4. *Palm Leaves.*

In their uses to the inhabitants of the tropics the family of palms represents almost all other families of plants. No part of these princes of the vegetable kingdom seems to be useless; and at every stage of their growth some new use appears to be developed. In the Mauritius collection the Countess GREY exhibited a basket and wreath of flowers formed out of the leaves of the double cocoa-nut palm (*Lodoicea Seychellarum*), which were considered worthy a Prize Medal.

In the Spanish collection were exhibited some most beautiful specimens of plait, made from the fibres of a species of palm; also some elegant cigar-cases from the Island of Luzon, and for which a Prize Medal was awarded to the Economical Society of Manilla. (Spain, 235.)

D. GENERAL MANUFACTURES FROM WOOD, NOT BEING FURNITURE.

Under this head is included turnery in its various branches; carving, not having a special application, and not producing a work of art; all kinds of coopers' work, as well as basket and wicker work.

1. *Turnery.*

Many of the articles exhibited in this Class illustrative of turnery have been already referred to under the head of the materials employed in this art, more especially under Ivory and Vegetable Ivory. The following Exhibitors displayed objects presenting many points of interest in the art of turnery, though not regarded by the Jury as of sufficient importance to be rewarded with Prizes:—

B. MITFORD (Off. Cat., 167). Concentric balls, made of solid spheres of box-wood. This curious art was first introduced by the Chinese.

GARRETT (Off. Cat., 141). Ornamental turned snuff-boxes in ivory and fancy foreign woods.

J. PEEL (Off. Cat., 175). Turning apparatus for cutting in relief in the lathe. Fac-similes of medals, coins, flowers, &c.

OSCAR SMITH (Off. Cat., 95). Specimen of ivory turning and carving, forming a pedestal, vase, and flowers. Unique specimen of ivory turning; a solid piece, the form of an egg, hollowed out to the thickness of the natural shell from a perforation of the twelfth part of an inch. Turned by George A. Smith, 22 May's Buildings, St. Martin's Lane.

W. D. HEMPHILL (Off. Cat., 158). Plain and ornamental ivory turning.

2. *Carving and Working in Wood.*

The more beautiful specimens of this art were referred to the Class of Fine Arts. The following collections, however, presenting many objects of interest, and good instances of the application of carving to utility and the improvement of the form of articles of ordinary use, were adjudged Prize Medals by the Jury:—

N. SCHRÖDER (Off. Cat., Grand Duchy of Hesse, 77). A collection of geometrical models. (Awarded a Prize Medal by Jury of Class X.)

N. P. THESSEN (Off. Cat., Sweden and Norway, 44). A collection of wooden vessels for various purposes, ornamented with carvings. These articles are made by the peasantry, and the present collection came from Christiania.

Captain SHEA (Off. Cat., China). A collection of objects brought by the Exhibitor from China, and consisting of carvings in various kinds of hard coal and in pearl.

KEHRLI BROTHERS, Meyringen (Off. Cat., Switzerland, 242). A collection of articles of various kinds carved in wood.

The HEIRS of G. LANG (Off. Cat., Bavaria, 77). Principally toys carved in wood.

J. WIRTZ (Off. Cat., Switzerland, 259). Various articles of wood carving.

Spa, in Belgium, has long been celebrated for its work in wood; and a collection of boxes, exhibited by J. E. MARIN (Off. Cat., Belgium, 414), was regarded as worthy a Prize Medal.

The Jury also wish Honourable Mention to be made of the beautiful collection of workboxes of the same kind exhibited by E. and L. MISSON (Off. Cat., Belgium, 412).

3. *Coopers' Work of all kinds.*

The collection of articles rewarded with Prize Medals in this department are regarded by the Jury as worthy of that distinction, both on account of the neatness and durability of the workmanship, and the cheap price at which they are sold. The American and Canadian pails are a very superior article, and calculated for extensive use in Europe. The tubs and casks from Switzerland and Portugal indicated admirable workmanship:—

J. BAILEY (Off. Cat., Canada, 86). Water-pails.

J. A. FAESSLER (Off. Cat., Switzerland, 229). Milk-tubs, &c.

G. LORING (Off. Cat., United States, 424). A large collection of water-pails.

J. W. MACGREGOR (Off. Cat., 146). Casks for ships.

A. P. RANGEL (Off. Cat., Portugal 1120). Wine-casks.

4. *Basket and Wicker-work.*

Several collections of articles in this division were exhibited, some deserving much credit, as those in the collection of the SCHOOL FOR THE INDIGENT BLIND; but the Jury did not observe any qualities in them that would call for more than the expression of their satisfaction at finding this branch of art represented in the Exhibition. A basket made of willow wood, worked in a peculiar manner, called the Sussex truck-basket, was exhibited by Mr. T. SMITH, of Hurstmonceaux (Off. Cat., 172), to which the Jury awarded a Prize Medal.

E. MANUFACTURES FROM STRAW, GRASS, AND OTHER MATERIALS.

The objects exhibited in this department were not numerous.

1. *Indian-Corn Straw.*

This substance is manufactured into brooms in the South of Europe and in

North America, and several collections of these articles were exhibited. The following were considered as deserving of Honourable Mention :—

NELSON and BUTTERS (Off. Cat., Canada, 84).

D. PASTORELLI (Off. Cat., Tuscany, 35).

R. WARNER and Co. (Off. Cat., United States, 431).

In the Canadian and American departments several Exhibitors contributed brooms of this material.

2. *Straw Work.*

In various parts of the Exhibition collections of straw, plaited and made into flowers, baskets, &c., were exhibited. In some instances willow shavings were plaited and made into articles of dress. The following rewards comprise various collections in this department which the Jury considered worthy of reward or distinction :—

Prize Medals.

ABT BROTHERS, Wohlen (Off. Cat., Switzerland, 227). Straw work. (Awarded a Prize Medal by Jury of Class XX.)

AMBROISE CLARAZ, Fribourg (Off. Cat., Switzerland, 228). Straw work.

C. D'HEUREUSE (Off. Cat., Prussia, 244). Straw work.

F. P. HAAS (Off. Cat., Wurtemberg, 79). Various forms of straw plaiting.

J. RENDALL (Off. Cat., 144). Straw work.

SULZBERGER and AKERMANN (Off. Cat., Switzerland, 234). Straw work. (Awarded a Prize Medal by Jury of Class XX.)

S. TANDLER (Off. Cat., Austria, 657). Straw flowers.

L. TOMASSIA (Off. Cat., Austria, 97). Willow plait.

Honourable Mention.

ISLER and OTTO, Wildegg (Off. Cat., Switzerland, 213). Straw work.

EDWIN LANKESTER, *Reporter.*

London, February 1852.

CLASS XXIX.

REPORT ON MISCELLANEOUS MANUFACTURES AND SMALL
WARES.*Jury.*

VISCOUNT CANNING, *Chairman*, 10 Grosvenor Square.

— WOŁOWSKI, *Deputy Chairman*, France; Professor to the Conservatory of Arts and Manufactures, Member of the Central Jury and of the Legislative Assembly of France.

WARREN DE LA RUE, Ph. D., F.R.S., F.R.A.S., F.C.S., &c., *Reporter*, 110 Bunhill Row, Finsbury, and 7 St. Mary's Road, Canonbury, Islington; Manufacturer of Ornamental Stationery.

A. W. HOFMANN, Ph. D., F.R.S., F.C.S., Corresponding Member of the Royal Academy of Turin, of the Philomathic Society of Paris, &c., *Joint Reporter*, Zollverein, 26 Albany Street, Regent's Park; Professor of Chemistry, Royal College of Chemistry.

ARTHUR HENFRET, F.L.S., 17 Manchester Street, Gray's Inn Road; Vice-President of the Botanical Society.

JOHN JOSEPH MEHEL, 4 Lendenhall Street; Maker of Dressing-cases and Cutlery.

OTTO SCHUMANN, Austria; Member of the Council of Commerce, Vienna.

W. K. SMITH, Virginia, United States; Mineralogist.

Associates.

D. W. MITCHELL, 11 Hanover Square; Secretary to the Zoological Society.

RICHARD OWEN, F.R.S. (Juror Class IV.), Professor to the College of Surgeons, Lincoln's Inn Fields; President of the College of Surgeons.

NATALIS RONDOT, France (Juror Class XXVI.), late of the Embassy to China, Member of the Central Jury; Delegate of the Chambers of Commerce of Lyons and Paris.

Members of other Juries, who by request attended some of the Meetings of the Jury, and furnished information on the Chemical Arts.

M. BALARD, France (Juror Class XXVIII.), Member of the Institute, Professor of Chemistry at the College of France, &c. &c.

A. PAYEN, France (Juror Class IV.), Member of the Institute, Member of the Central Jury; Professor to the Central School, and to the Conservatory of Arts and Manufactures, at Paris.

THE number of Exhibitors of all nations in this Class is Seven hundred and forty-two.

According to the list furnished under the title of Head Juries, this Class was intended to comprise the following articles:—

A. Perfumery and Soap.

B. Articles for Personal Use, as Writing-desks, Dressing-cases, Workboxes, when not exhibited in connexion with precious metals (XXIII.), and Travelling-gear generally.

- C. Artificial Flowers.
- D. Candles and other means of giving Light.
- E. Confectionary of all kinds.
- F. Beads and Toys, when not of hardware ; Fans, &c.
- G. Umbrellas, Parasols, Walking-sticks, &c.
- H. Fishing-tackle of all kinds, Archery, &c.
- I. Games of all kinds.
- J. Other Miscellaneous manufactures.

The latter title is very comprehensive, and might have been made to include all objects not specially enumerated in the lists of other classes. Practically, however, little difficulty was experienced in arranging with the Juries of other classes for their adjudication of those manufactures with which they were most conversant : consequently to the above list there will have to be added only Artificial Essences, Blacking, Lucifer-Matches, Artificial Ivory, Taxidermy, Ethnographical Models, Educational Models, Pipes and Amber-manufactures, and Snuff-boxes. Candles were the only means of giving light brought before the notice of this Jury ; and of beads, those of amber only were taken into their consideration. The term Miscellaneous, nevertheless, was retained, in order to enable the Jury to review a few objects not admitting of classification under the preceding heads.

The English Jurors held a preliminary meeting on the 13th of May 1851, and on the 17th, the foreign Jurors having been appointed, the full Jury assembled and elected their Deputy Chairman and Reporters. From this date until the 23rd of July, inclusive, the Jury continued their meetings for the most part three times a week, and having, on the latter day, sent in their final List of Awards, they adjourned.

Owing to the very various character of the manufactures brought before the notice of the Jury, it was quite evident, as its members could not be equally conversant with all, that it would be expedient to divide the Jury into Sub-committees, of which Four were formed, whose duty it was to make a preliminary examination of certain allied classes of manufacture, and to report thereon before the discussion of the Awards took place. In those preliminary examinations the Committees availed themselves freely of their privilege of calling in the aid of persons more intimately acquainted than themselves with the technical merits of particular branches of art.

It was likewise the duty of the Committees to make a list of objects belonging to their various sections ; a labour attended with no little difficulty on account of the necessarily imperfect state of the Catalogue at that time, and also from the classification, which was adopted in the British department, being impossible in the colonial and foreign sections. Even in the British section, Class XXIX. did not include all the articles ultimately submitted to the judgment of the Jury, and the Committees had often to search for them in other Classes.

The examination of the goods was usually commenced before eight o'clock in the morning, and continued for six or eight hours during each day, the earlier hours being occupied by the entire Jury in visiting the various stands and discussing the Awards ; whilst soon after the admission of the public the Jury, for convenience, again divided into Committees. It is quite possible that with all the care

bestowed on the search for objects belonging to Class XXIX., some articles may have escaped notice; yet the fact of the same Exhibitor having been rewarded by more than one Jury, elicited on comparison of the Award-books at the close of our labours, amply testifies the anxiety on the part of the Jurors generally not to pass any object of merit, even though they might feel doubtful as to its belonging to their respective classes.

In recommending subjects for the award of the Council Medal, the Jury of Class XXIX. adhered strictly to the spirit of the instructions of the Council of Chairmen, and of the explanation given in the "Minute of the Royal Commission on the award of the Council Medal," and in no case have they made any application for its grant, except for *a new and useful invention in important arts*. The recommendations were Three in number, namely, in favour of:—L. A. DE MILLY, France, No. 644, for the invention of practical methods of using lime in the manufacture of stearic candles, and the use of boracic acid in the preparation of their wicks; PRICE'S CANDLE COMPANY, Class IV., No. 83, for the invention of improved methods of treating and distilling fatty bodies, and the application of the products obtained thereby to the manufacture of candles; J. MARQUES CONSTANTIN, France, No. 94, and Portugal, No. 1299, for the invention of an elastic dressing to the materials used in the manufacture of artificial flowers, whereby they are not permanently injured if crumpled in packing, but regain their form on being slightly shaken; also for the adaptation of textile fabrics to the imitation of flowers for botanical museums. These recommendations were unanimously confirmed by the Group E of Juries; but the Council of Chairmen, whilst confirming the award of the Council Medal to L. A. De Milly and J. M. Constantin, negatived that in favour of Price's Candle Company. The Jury feeling that they had not made the recommendation until after a laborious investigation on the part of the Chemical Committee, Messrs. De La Rue, Hofmann, and Smith, and after ample discussion on their parts, protested on the 23rd of July against the decision of the Council of Chairmen in the following terms:—

"The Jury of Class XXIX. unanimously and respectfully protest against the decision which the Council of Chairmen have come to respecting the recommendation of a Great Medal for Price and Company; and feeling that their decision is based upon insufficient information regarding the merits of the case, they hope that the Council of Chairmen will not refuse to reconsider the matter."

In consequence of this protest, the Chemical Committee were invited to attend the meeting of the Council of Chairmen; two of their number, the Reporters, did so, and fully explained the grounds on which the recommendation had been made; but (as they were informed) it was subsequently found, on reference to the minutes of a preceding meeting, that in consequence of a decision with regard to awards generally which had once been taken into consideration, the protest could not be entertained by the Council of Chairmen. The Reporters, however, cannot but regret that there should have existed any impediment to the correction of a decision which, from a careful scrutiny of the merits of the case, they consider erroneous.

The Prize Medal has been awarded for excellence of workmanship, novelty of construction, beauty of design, or goodness of manufacture, combined. At first sight it may appear strange that the same reward has been given to a child's toy

and to the botanical models in wax of flowers; to the important chemical art of stearic candle-making, and to the apparently insignificant sugar-confectionary. On reflection, however, it must become evident that the only method of making the Awards was to discard for the moment the consideration of all Arts except the one immediately under discussion, and to reward excellence in that one, irrespective of its value as compared with any other. The estimation of the amount of merit recognised by a Medal must, therefore, mainly depend on the nature and difficulties of the manufacture for which it is given, and marks only that an individual Exhibitor has attained a degree of perfection in no case inferior to that to be expected from the existing state of the art as evinced by the examples in the Building, or known to have been produced elsewhere. In the same branch of industry questions of relative merit were only so far gone into as not to reward mediocre or bad productions; and consequently it will be seen that the Medal is in most cases a mark of *positive*, and not of *relative* merit, the Jury not having pretended to select the *best* only, but also the *very good*. This will be best illustrated by quoting an example, and for that purpose one of the most important arts is selected, namely, that of soap-making. In this no extraordinary superiority of any one manufacturer was evinced above all the rest, but a great number had attained a high degree of perfection, in which only differences of degree might be traced. It is evident that the Jury could not have selected any one, or even two or three, for reward without doing an injustice to many others; and it became necessary either to give no Medals at all, or to give one in all cases of decided merit. The Jury chose the latter alternative.

The distinction of Honourable Mention has been accorded in those cases where the merit of the Exhibitor was far above mediocrity, yet still below that of the recipients of the Prize Medal.

The detailed Report is arranged in an order slightly differing from that set forth at the commencement of this introduction, the following being the arrangement which was decided on:—

A. *Manufactures depending upon Chemical principles.*

Soap and Perfumery.
Candles.
Protean Stone, or Artificial Ivory.
Blacking.
Chemical Matches.
Confectionary, and Fruits preserved in Sugar.

B. *Manufactures relating to Natural History.*

Artificial Flowers.
Taxidermy.

C. *Articles connected with Education.*

Educational Models.
Ethnographical Models.
Collections of Produce.

D. *Manufactures for Personal Use.*

Dressing-cases, Writing-desks, Work-boxes, &c.
Umbrellas and Parasols.

Walking-sticks.

Fans.

Pipes and Amber-manufactures.

Snuff-boxes.

E. Manufactures relating to Amusements.

Apparatus for Manly Games, viz., Cricket, Archery, Rackets.

Fishing-tackle.

Toys.

F. Miscellaneous.

Including all articles not sufficiently numerous or important to be classified under distinct heads.

The plan followed has, in most cases, been to give a short historical sketch of the progress of an art, to discuss the scientific principles on which it is based, and to add such a description of the process employed as to enable the general reader to comprehend its chief details. The productions of each country, in alphabetical order, are then stated, and, lastly, the chief contributions of the successful Exhibitors are specially noticed. The Report, however, is necessarily unequal in its details; some notices being much more complete than others. The Reporters are quite aware of these and other defects, and can only plead the very great difficulty of obtaining correct information on such a variety of subjects as the Report contains, and the very diversified nature of the goods exhibited.

The Reporters have great pleasure in thanking their colleagues, Viscount Canning and Mr. Arthur Henfrey, for Reports on special subjects; M. Natalis Rondot, for information respecting the arts in France and in China; and Mr. J. J. Mechi, for the communication of statistics in some branches of trade; and, lastly, in acknowledging the assistance of their friends, Mr. Richard Thomson, Librarian of the London Institution, and Dr. Anthony, in supplying much historical matter. The Commissioners of Her Majesty's Customs, and John Wood, Esq., the Chairman of the Board of Inland Revenue, have also obligingly furnished the Reporters with statistical information respecting the Imports into, the Manufactures of, and the Exports from, the United Kingdom; for which they take this opportunity of publicly expressing their best thanks. They have also made free use of those valuable French and Belgian Reports, entitled respectively "*Rapport du Jury Central sur les Produits de l'Agriculture et de l'Industrie Exposés en 1849*," and "*Rapport du Jury et Documents de l'Exposition de l'Industrie Belge en 1847*."

A.—MANUFACTURES DEPENDING UPON CHEMICAL PRINCIPLES.

I.—SOAP AND PERFUMERY.

The first of the two branches of industry now to be considered is probably of greater interest than any which will be discussed in the succeeding sections. The magnitude of the manufacture of soap, the importance of the trade, and the enormous capital embarked in it, as well as the wonderful relation which it bears with regard to the most important links in the chain of chemical industry,

is not often sufficiently estimated. A distinguished chemist* of the present day says—

"The quantity of soap consumed by a nation would be no inaccurate measure whereby to estimate its wealth and civilization. Political economists, indeed, will not give it this rank; but whether we regard it as joke or earnest, it is not the less true, that, of two countries with an equal amount of population, we may declare with positive certainty, that the wealthiest and most highly civilized is that which consumes the greatest weight of soap. This consumption does not subserve sensual gratification, nor depend upon fashion, but upon the feeling of the beauty, comfort, and welfare attendant upon cleanliness; and a regard to this feeling is coincident with wealth and civilization. The rich, in the middle ages, who concealed a want of cleanliness in their clothes and persons under a profusion of costly scents and essences, were more luxurious than we are in eating and drinking, in apparel and horses; but how great is the difference between their days and our own, when a want of cleanliness is equivalent to insupportable misery and misfortune!"

It is interesting to cast a glance upon the early history of this important branch of trade. No mention of soap is to be found in the works of authors prior to the Christian era. The term soap occurs repeatedly in the Old Testament,† but the learned Beckmann‡ has proved, in his *Treatise on Soap*, that the Hebrew word "*Borith*," which has been rendered soap, rather means alkali. One of the most ancient descriptions of bathing and washing is to be found in Homer's§ narrative of the preparations made by the mother of the lovely Nausicaa for the washing expedition to the river. Life-sustaining meats and refreshing wines, softening oil in golden vessels for anointing the skin, are carefully enumerated: but soap formed no part of the inventory. The Homeric virgins were ignorant of this invaluable oleo-alkaline compound. Pliny|| is the first writer who gives us an authentic account of soap. He states that it is made from tallow and ashes, the best materials being goats' tallow and beech-ash. He was also acquainted with the hard and soft varieties of soap; he calls it a Gallic invention, but states that it was particularly well prepared in Germany, where the men were more in the habit of using it than the women. It served to colour the hair yellow. From the description of Pliny it is evident that he really means soap, although the purpose for which it was employed creates some difficulty: and it would appear that the soap of the ancients contained some colouring agent, and served chiefly as a hair-dye, and likewise as a remedial agent. It does not seem that it was used for the purposes for which it is now almost exclusively employed. Besides several kinds of fullers' earth,¶ and plants with saponaceous juices (*struthium*), the ancients availed them-

* Liebig's *Familiar Letters on Chemistry*, Letter xi., p. 129.

† *Jeremiah*, c. ii., v. 22; *Moloch*, c. iii., v. 2.

‡ Beckmann's *History of Inventions*, translated by Johnston, fourth edition (Bohn).

§ *Odys.* vi.

|| Pliny, *Nat. Hist.*, xxviii. (vol. ii., page 328 of Holland's translation), and in speaking of soap ointment, xxiii., cap. 2, page 158.

¶ Several varieties of fullers' earth are exhibited in the Grecian section, Nos. 15 and 16, which, in all probability, are identical with those formerly used by the classical ancients; the reader is referred for the details to the *Illustr. Cat.*, vol. iii., pages 1402-3. There is also a specimen of fullers' earth contributed to the South African department by J. Calf (No. 55). See vol. ii., p. 952.

selves of solutions of soda and potash, which continue in use for washing in the present day. Strabo speaks of an alkaline water (soda) in Armenia which was used by the scourers for washing clothes, and we find express mention of the employment of a lye made with the ashes of plants (pot-ashes), in cleansing oil and wine-jars and the images of the gods in the temple.* The method of strengthening the lye by means of quicklime was known, undoubtedly, in the time of Paulus Ægineta. The agent most commonly used for washing garments, however, was putrid urine, which is still employed in the cloth districts for washing wool. The fullers were literally and metaphorically in bad odour, and were required to exercise their trade outside the town, or in unfrequented streets; but they were permitted to place tubs at the corners of the streets for the convenience of passengers and their own profit. Regarding urine in the light of soap, the Emperor Vespasian may be said to have originated the soap-duty, as this source of revenue was not lost sight of by him; though, as Beckmann remarks, it does not appear very clear how the tax was collected.

After Pliny, soap is mentioned by Geber, in the second century of the Christian era, and at a later period frequently by the Arab writers; but although undoubtedly used for washing, it is spoken of chiefly as a remedial agent for external application. It would be a difficult matter to trace the onward progress of soap-making, step by step, but it is certain that the boiling of soap flourished in the seventeenth century, as we possess extensive directions of that date for its preparation.

It is only in the most modern times that the soap manufacture has attained that extraordinary development which distinguishes this branch of trade; various circumstances have contributed to produce it. The valuable researches of Chevreul, although they explain the nature of saponification, have contributed less to the advance of the soap-manufacture than to that of candle-making, hereafter to be described. On the other hand, the development of the manufacture of soda has proved a most powerful stimulus to that of soap, which, when freed from its dependence on the uncertain and limited supply of harilla and kelp, made such strides as could not have been anticipated. Mr. James Muspratt, who was the first in England to carry out successfully, and on a large scale, Leblanc's method of preparing soda from chloride of sodium (sea-salt), informs us that he was compelled to give away soda by tons to the soap-boilers before he succeeded in convincing them of the extraordinary advantages to be derived from the adoption of this material. As soon, however, as he had effected this, and when the soap-boilers discovered how much time and money they saved by using artificial soda, orders came in so rapidly that Mr. Muspratt, to satisfy the demand, had his soda discharged red-hot into iron carts, and thus conveyed to the soap manufactories. From that period a constant race was kept up between soap-making and the artificial production of soda; every improvement in Leblanc's process was followed by an extension of the soap trade, and it is a curious fact that the single seaport of Liverpool exports annually more soap at present than did all those of Great Britain previous to the conversion of chloride of sodium into carbonate of soda.

* Egypt has sent some very interesting specimens of *Natron*, or native sesquicarbonate of soda; this salt is the *trona* of mineralogists. Tunisia has also contributed a specimen. See Egypt, Nos. 11, 16, 17 (*Illustr. Cat.*, vol. iii., p. 1408), and Tunisia, No. 149 (p. 1416).

The manufacture of soap has, on the other hand, been a powerful stimulus to the preparation of soda and of the important secondary product, hypochlorite of lime (bleaching powder), which are so intimately allied with almost all branches of chemical trades: thus soap occupies one of the most important pages in the history of applied chemistry. The increase in the consumption of this article has led, moreover, to the discovery of new materials for its production; it has opened new channels to commerce, and thus it has become the *means* as well as the *mark* of civilization. Almost simultaneously with the employment of soda, the oils of the cocoa-nut and the palm have been introduced into the manufacture of soap. The following statistics respecting the imports into the United Kingdom and France best demonstrate the increasing consumption of these oils:—

Imports of Palm-oil in	-	1820	-	-	Cwts.	17,456
"	"	1830	-	-	"	213,476
"	"	1840	-	-	"	315,503
"	"	1850	-	-	"	447,796
Imports of Cocoa-nut-oil in	1820	-	-	-	Cwts.	8,353
"	"	1830	-	-	"	8,534
"	"	1840	-	-	"	42,428
"	"	1850	-	-	"	98,039

The consumption of palm and cocoa-nut oils in France, although considerably less than in the United Kingdom, is rapidly increasing, as will be seen by the following Table.

Imports of palm and cocoa-nut oils into France:—

1827	-	Cwts.	3	1840	-	Cwts.	4,622
1829	-	70	1845	-	33,091		
1830	-	256	1850	-	62,610		
1835	-	253					

The development of the trade in palm-oil has contributed largely to the abolition of the iniquitous slave-trade on the west coast of Africa, and in many parts of the coast has entirely suspended it.

Theory of the Formation of Soap.

Before we proceed to the examination of the separate specimens of soaps exhibited, a few words may be said respecting the materials employed in their manufacture. They are, on the one hand, alkalies, and on the other, fatty and resinous substances derived from the organism of animals and plants, especially tallow, lard, palm-oil, cocoa-nut oil, olive-oil, linseed-oil, fish-oil, and common rosin. Although physically and chemically widely distinguished from one another, fats and oils present numerous analogies. None of these substances is a pure chemical compound; the majority are mixtures in varying proportions of different chemical bodies, which may be isolated by mechanical or chemical processes. When this separation has been effected, the isolated substances which are the proximate principles of the fatty or oily bodies, though again differing much from one another, exhibit one common chemical character: when exposed to the influence of powerful decomposing agents, they are broken up in a similar manner, yielding on the one hand an acid, and on the other a neutral body.

All fats may be resolved into two proximate fatty substances, one of which is fluid at the common temperature—it is termed *olein*; the other is solid, and is called *stearin*. The preponderance of one or the other of these proximate constituents determines the state of aggregation of the fat. The body usually designated *stearine* is generally a mixture of the *stearin* of the chemist and an analogous body, *margarin*, the two substances differing in their relative proportion according to the source from which the fat is obtained. Thus, the solid fat from sheep (tallow) contains chiefly *stearin*, that of the pig (*lard*), and of olive-oil, chiefly *margarin*; the solid fat of palm-oil is *palmitin*, that of cocoa-nut-oil, *cocin*.

Stearin, *margarin*, *olein*, *palmitin*, and *cocin*, are all compounds of certain fatty acids with oxide of glyceryl, and may be viewed as substances resembling neutral salts, or rather compound ethers. The changes which all these substances undergo when submitted to the action of powerful bases, is well illustrated by the deportment of *olein* with oxide of lead (*litharge*). When boiled with this base, the *olein* is decomposed into *oleic acid* and oxide of glyceryl. The former combines with the base forming an insoluble soap, called *oleate of oxide of lead* (*diachylon plaster*), and the oxide of glyceryl, separating in combination with water, forms *glycerin* (hydrated oxide of glyceryl), a substance having a certain analogy with the group of bodies termed *alcohols*. It remains dissolved in the water employed. If *olein* is boiled with a solution of potash or soda, *oleates of potash or soda* are obtained; but being soluble in water, they remain dissolved together with the *glycerin*.

The *oleates of potash or soda*, when separated from the water by processes immediately to be discussed, are what we call in common life *Soaps*. Similar soaps are formed by the remainder of the fatty acids, for example, *stearic* and *margaric acids*. *Palmitate of soda*, obtained by boiling palm-oil with soda, likewise forms a chief ingredient of many soaps.

Potash and soda, as they occur in commerce, are combinations of the alkaline bases thus denominated by the chemist, with carbonic acid; and though, by long boiling, they could decompose (saponify) fats, yet the operation is tedious and the saponification generally incomplete. It is better to deprive the alkalies of their carbonic acid, which is done by mixing them with quick-lime and water; the quick-lime combines with the carbonic acid, forming an insoluble carbonate of lime (*chalk*), and the water retains the potash or soda in solution, contaminated still with such impurities as the alkalies contained (sulphates and chlorides, for example), and a minute quantity of caustic lime.

Common *rosin* (*colophony*) is the residue of the distillation of natural turpentine, and consists principally of *pinic acid*, together with a little *sylvic* and *colophonic acids*. When *rosin* is boiled with alkalies, carbonated or not, a compound is readily obtained, but of course no *glycerin*. Thus, when it is boiled with soda, a *pinate of soda* is chiefly produced. This compound exists in considerable quantity in *yellow-soap*, and gives to it its distinctive character.

The character of soap is not only affected by the nature of the acids which it contains, but also by that of the alkali which has served for its preparation; the soaps containing potash are generally soft and pasty, those prepared with soda are hard and solid.

The compounds of *stearic*, *margaric*, *oleic*, *palmitic*, *cocinic*, *pinic*, and *sylvic acids* with potash or soda are all readily soluble in alcohol and hot water, but

more so in the former, which, on evaporation, leaves the soap in a translucent state; hence its application in the preparation of "Transparent soaps." Soaps, however, are insoluble in a solution of many neutral salts, particularly when concentrated; this property is of great use to the soap-boiler, who employs it for the separation of the soap from its solution in water, generally adding common salt to set the soap at liberty. As soaps are likewise insoluble in strong alkaline lyes, the same end is sometimes attained by boiling down the soap to a certain consistence, when it separates from the excess of lye.

The soap made with cocoa-nut-oil is, however, soluble in very strong brine, and the same plan of separation does not succeed with it; but as it is more generally employed together with other fats, this difficulty is then overcome. Its property of dissolving in salt water renders it peculiarly adapted to the formation of a *Marine soap*. One remarkable property of cocoa-nut-oil-soap is, that of solidifying with a much larger quantity of water than most other soaps, thus giving a larger yield, but, of course, being of proportionally less value. This property is, however, unfortunately often turned to profitable account by the soap-maker. As an instance, may be quoted an analysis of Dr. Ure, who found a London cocoa-nut-oil-soap to contain 75 per cent. of water, whereas 25 per cent. of water is a large quantity for any but potash-soaps to contain, and these generally contain less than 50 per cent.

The greater part of our knowledge concerning the chemical constitution of fats, and the changes which accompany their decomposition under the influence of alkalis, is due to the masterly researches of Chevreul, prosecuted with wonderful acuteness and perseverance from 1813 to 1823, when they were published in Paris, in a collected form, under the title of "*Recherches Chimiques sur les Corps Gras d'Origine Animale*," a work which will ever remain a model of philosophical inquiry.

Processes.

There are two processes chiefly employed in the preparation of soaps, the most simple of which is that called the *Cold-process* (from the combination being attained at temperatures below the boiling-point of water), or the *Small-boiler process* (as it is generally effected in comparatively small vessels). For the purpose of making soap in this manner, the alkaline lye is prepared from the purest commercial soda, and concentrated by evaporation. As the chloride of sodium and sulphate of soda, which commercial soda contains, are nearly insoluble in a strong alkaline solution, they crystallize out, especially on allowing the lye to stand for some days, thus leaving it much purer. A weighed quantity of fat is melted, and the strength of the lye having been previously ascertained by taking its specific gravity, a certain portion is weighed or measured, and separately heated and then stirred with the melted fat. Saponification soon occurs, and, on cooling, the soap solidifies. It is very evident that soap made in this manner must contain the glycerin; moreover, as it is very difficult to obtain an exact neutralization of the fat or alkali, one or the other is often in excess, generally the fat; this prevents such soap from giving so good a lather as those prepared by the more usual method.

The ordinary method is called the *Large-boiler-process*, as it is usually conducted on a very large scale, in boilers capable of holding many tons. A quantity of weak soda-lye is put into the iron or copper boiler and raised to the boiling-point,

and the whole of the fat is generally added at one time. The ebullition is then carried on for some hours, and when the lye has become exhausted of its alkali, it is pumped away, and a fresh portion of lye is added. After repeated boilings and pumpings, the saponification is completed, and the soap is brought to strength by boiling down.

Now the soap-boiler may wish to prepare either white or mottled soap. If a white or Curd-soap is required, the soap is "*fitted*," that is, boiled, with a certain quantity of water, or weak lye, and allowed to settle, when the black impurities ("*nigre*") fall to the bottom, and the soap is then removed to the frames and allowed to cool. These frames are composed of a number of separate planks, to facilitate the removal of the soap.

The Mottled-soap is prepared in a similar manner, except that the operation of fitting is dispensed with, and the "*nigre*" is left in the soap. This nigre consists chiefly of sulphide of iron, produced by the action of the lye, which always contains a minute quantity of sulphide of sodium, on the vessel. In Marseilles, and other countries where olive-oil-soap is made, a quantity of sulphate of iron (green copperas) is added, and in this case, the mottling is produced jointly by the sulphide of iron (the black portion) and a true iron soap (the red portion). In order that the metallic compound may not fall to the bottom (as in *fitting*), the soap has to be much more concentrated; when removed from the boiler it is of one uniform slate tint, but as it cools, the metallic compounds separate into nodules, and by the trickling of the excess of lye through the mass, they take up certain forms, which produce the appearance called mottling. Hence mottled-soap is of more value, from its containing a less proportion of water.

It is evident, on comparing this with the cold-process, that it is much more scientific, as an excess of alkali may be employed to insure complete saponification, with the perfect certainty that it can be got rid of in the lyes; the glycerin is also removed with the impurities contained in the fat, at each pumping; and a very pure chemical compound is obtained, notwithstanding the employment of comparatively impure materials. If the soda-ash employed does not contain sufficient saline impurities to throw up the soap, it is necessary to add a solution of common salt to effect this object each time the exhausted lye is pumped off.

There have been several patents for changes in the process of the manufacture of soap, one of which (by Arthur Dunn) was for effecting the saponification in close vessels, at a very high temperature, 154°·5 C. (310° F.); this plan has not, however, been generally adopted.

Another patent was obtained for an exactly opposite plan, by Mr. Hawes, who, making use of strong lyes and much mechanical mixing, effects the saponification of the fats in a comparatively cold state. The product is then put into a copper and "*fitted*" in the ordinary manner.

Several patents, taken out for supposed improvements, are in reality plans for the adulteration of soap; amongst which may be instanced the preparation of soap from bones, fish, &c., which is merely introducing an adulteration of gelatin. Other plans consist in the introduction of Cornish clay, fullers' earth, and other similar materials.

The Floating-soap, exhibited in many Foreign Sections, is prepared by melting ordinary soap with the addition of a certain quantity of water, and then beating

it into a thick froth, by means of a paddle, until it occupies twice its original bulk. Formerly this kind of soap was made in considerable quantities in England, but it is now very rarely manufactured, and was not exhibited at all in the British Department.

The soap called Silicated-soap, now manufactured extensively at Liverpool, is formed by mixing a basic-silicate of soda (made by boiling powdered flint in a close vessel under pressure with caustic soda) with hard-soap in the melted state. It appears to possess remarkable detergent properties, but is liable to feel gritty in the hand.

Wax-Soap.—This soap, which is made from wax and soda by the paper-hanging makers to mix with their distemper-colours, in order to prevent their rubbing off, cannot be considered as a true soap in the ordinary acceptance of the term. For Brodie's elaborate researches "*On the Chemical Nature of Wax*,"* clearly prove that on boiling wax with weak soda-lye, part only of the wax (the free cerotic acid) is saponified; the remainder, which is a neutral fat or ether (palmitate of oxide of mellissyl*), is not acted upon, and is contained in admixture with the cerotate of soda in the state of emulsion; probably the valuable properties of wax-soap are in some measure due to this circumstance.

Properties and Action of Soap.

The detergent property of soap is usually considered to be dependent entirely on the quantity of alkali which it contains, and hence the question arises why pure alkali should not be employed in preference. An objection to this is the caustic character of the alkali, which is injurious not only to the hands of the person using it, but also destructive of the articles washed, and especially of some colours of dyed goods. By combining with fatty acids, the alkalies are rendered essentially milder in their action without being deprived of their capability of entering into combination with various impurities, and more particularly with certain fatty bodies. The most common explanation of the washing power of soap is founded upon Chevreul's observation, that soaps are decomposed by large quantities of water, giving rise on the one hand to acid-soaps, and, on the other, liberating a quantity of free alkali which remains in solution. According to this view soap is a sort of magazine of alkali, which it gives up in the exact quantity required at any moment when it is rubbed with water. The combination of the alkali with some part of the dirt cannot be denied. Several constituents of this very indefinite admixture of many substances are of an essentially acid character, especially those derived from perspiration: others become acid when exposed on a large surface to the action of the air, in consequence of a sort of spontaneous saponification. This action cannot, however, be the sole *modus operandi* of soap, the valuable properties of which without doubt arise, in a great measure, from its power of dissolving substances which are insoluble in water. We know that certain mineral salts exert a solvent power upon substances which are entirely insoluble in water: thus it is well known that borax causes shell-lac to dissolve with great facility, and the chemist will at once call to mind the remarkable solvent property possessed by a soapy compound readily formed in the animal organism; bile is essentially a combination of an alkali

* *Philosophical Transactions*, Part I., 1840.

with fatty acids (glycolcholic and taurocholic,) and it dissolves with great facility the neutral body cholesterin, which, like fats, is insoluble in water. In addition to these two modes of operation, soap doubtless also produces a mechanical effect. The property which it has of increasing the cohesion of water, so as to enable it to form a lather or froth, is most valuable in the removal of solid insoluble particles of dirt which are carried away by the frictional action of the suds when forced into and out of the minute interstices of the substances subjected to the operation of washing, and are kept suspended by the froth and thus prevented from again soiling them.

If we adopt these views regarding the operation of soap, they guide us at once to a correct estimation of its washing capacity. It increases in a direct ratio with the quantity of *true* soap which it contains; the determination of the amount of water (by the simple device of drying the substance in the state of thin shavings at 100° C., 212° F.), consequently materially assists in the determination of the value of soap. But to arrive at an exact and rigorous knowledge of this value a chemical analysis is necessary, and more especially when adulteration is suspected. We need scarcely remark, that the Jurors were unable to subject to analysis the varieties of soap of the numerous Exhibitors, many of whom had sent ten or more samples of different kinds. They therefore contented themselves generally with comparative trials of the detergent power of the various soaps, and for that purpose they had samples from all the Exhibitors. The toilet soaps were judged of likewise by their perfume and presentability, and their freedom from gritty particles.

Perfumery.

From the earliest times of which we have any record, the sense of smell has been gratified with perfumes; the Egyptians applied them as conservative of the bodies of their deceased friends, and as incense before their venerated deities. On the wall of every temple in Egypt, from Meroe to Memphis, the censer is depicted smoking before the presiding deity of the place; on the walls of the tombs glows in bright colours the preparation of the spices and perfumes for the embalmment of the mummy, and these very mummies and the vases of Oriental alabaster transported to our museums, tell with eloquence the same tale.

From the time of the *Exodus* throughout the long period of Jewish history, Holy Writ records the use of perfumes. Moses speaks of being directed by the Lord to prepare two perfumes, according to the art of the apothecary or perfumer, one of which was to be offered from the Golden Altar, and the other to be used on the person of the officiating priest. The "Spouse" in the Canticles is enraptured with the spikenard, the cinnamon, the aloe, and the myrrh; and Ezekiel accuses the Jews of diverting the use of perfumes from the Holy things to their own persons. In the New Testament, also, are contained frequent references to the use of perfumes, many of which will be in the memory of our readers. Especially, however, they will remember in chap. xiv. of the Gospel of St. Mark, that when Jesus sat at meat in the house of Simon the leper, "There came a woman having an alabaster box of ointment of spikenard, very precious, and she brake the box and poured it on his head."

Of the use of these luxuries by the Greeks, and afterwards by the Romans, the detail is more copious. Pliny gives much information respecting perfume-drugs,

the method of collecting them, and the prices at which they sold. Oils and powder-perfumes, according to Seneca, were most lavishly used; for even three times a-day did some of the luxurious people whom he describes anoint and scent themselves, carrying their precious perfumes with them to the baths in costly and elegant boxes called "*Narthecia*."

The trade from the East in these perfume-drugs caused many a vessel to spread its sails to the Red Sea, and many a camel to plod over that track which gave to Greece and Syria their importance as markets, and vitality to the Rock-City of Petra. And Southern Italy was not long ere it occupied itself in ministering to the luxury of the wealthy by manufacturing unguents or perfumes. So numerous were the "*unguentarii*" that they are said to have filled the great street of ancient Capua, the *Septasia*. In short, whether to regale the nostrils of their deities while sacrificing, or their own while feasting, or to prevent those nostrils from being offended by defunct humanity or the exhalations from crowded masses of people, the consumption of perfumes by the ancients was enormous. Happily in modern times the free use of soap has superseded the necessity for their lavish employment.

When we consider that there are some persons who appreciate the strong smelling musk more highly than any other, and another who would "die of a rose in aromatic pain," the definition of a perfume becomes a matter of some difficulty. Notwithstanding, however, the various impressions that volatile substances make upon different constitutions, a few general principles may be determined by which perfumery may be judged. In the first place, it is necessary to distinguish whether the substance is a chemical compound, or whether it is a mechanical combination of various chemicals. In the former case, if carefully prepared, it is independent of the perfume, and its odour, whether agreeable or repulsive, has a determined character of its own. In the latter case, that is, if the scent depends upon a mixture of substances, an opportunity is offered to the manufacturer of exhibiting his skill. Perfumes, on evaporation, should yield no resinous residue, and the various essential oils of which they are made ought to be combined so harmoniously, that none of the components is perceptible, not only at first, but even during the progress of evaporation. The less the ingredients differ from one another in odour and volatility, the less difficult it becomes to achieve this desideratum. Hence well-prepared Eau-de-Cologne is generally considered to be the perfection of perfumery. The constituents of this scent are, so far as is known, the essential oils of the lemon, the citron, and orange, prepared from the fruit in different stages of maturity, and they approximate so closely to one another as to produce a single aromatic impression. Other oils are added to Eau-de-Cologne, but in so minute a proportion that they scarcely demand any notice in comparison with those mentioned. Eau-de-Cologne, that leaves a residuary odour, either of otto-of-roses, oil-of-cloves, or oil-of-cinnamon, after volatilization, however agreeable these oils may be to individuals, must be designated as of inferior quality.

Still much practice is necessary to ascertain differences in the quality of the perfumes, and the task is rendered more difficult if numerous specimens have to be compared; for this reason the Chemical Committee returned repeatedly to the examination of the various specimens before reporting to the Jury, by whom the Awards were only fixed after a further investigation.

Several of the perfumes, or rather essences, exhibited are of particular interest,

and deserve an especial notice. We allude to a series of artificial organic compounds possessing qualities which permit of their substitution for natural volatile oils and essences. Most of them are substances belonging to the group of compound-ethers. The fruity odour of these bodies has been long known, but they do not appear to have been used in flavouring, until the chemist had shown that many of the oils of vegetable origin resemble in their composition the above-mentioned products of the laboratory. For some years past a scent called Winter-green oil has been extensively used in perfumery; it is obtained from an ericaceous plant, the *Gaultheria procumbens*, and is imported from New Jersey in America, where it is obtained in considerable quantities. Chemical analysis of this oil has yielded the interesting result that it is a true compound ether, consisting of salicylic acid and pyroxylic spirit, which may be formed by a combination of its proximate constituents, so as to possess all the characters of the natural substance. This observation was not lost upon commercial enterprise, and several of the numerous ethers prepared by the chemist were soon discovered to present the odour of certain fruits in so marked a degree, that it was difficult not to conclude that the fruits in question owed their smell to these ethers.

Several artificial essences of this kind are exhibited. Neither the time nor the quantity of material at the command of the Reporters permitted them to examine all these products; they are therefore obliged to confine themselves to a notice of the following:—

Pear-Oil is a spirituous solution of acetate of oxide of amyl. The latter may be obtained with facility and to any amount, by distilling equal parts of concentrated sulphuric acid and fusel oil (the oily residue obtained by the rectification of potato or grain spirit) with two parts of acetate of potash. It is remarkable that the ether itself does not possess a very pleasant odour, and that its striking resemblance to that of pears does not become apparent until properly diluted with spirit. Artificial pear-oil is now prepared in large quantities in England. It is chiefly employed in the manufacture of the lozenges called pear-drops, of which the Exhibition presents some specimens, so that the flavour in its applied state may be tested side by side with the perfume.

Apple-Oil consists mainly of valerianate of oxide of amyl. It is obtained as a secondary product in the preparation of valerianic acid, by the distillation of fusel oil with bichromate of potash and sulphuric acid. The distillate has to be shaken up with a dilute potash-solution in order to remove the valerianic acid, when the ether floats on the top, and may be removed with a pipette.

Pine-apple Oil is contributed by most of the Exhibitors of artificial essences; the specimen analysed was found to consist almost exclusively of butyrate of oxide of ethyl, or common butyric ether. It is easily obtained by boiling butyric acid (obtained from sugar by fermentation with putrid cheese) with strong spirit and a small quantity of concentrated sulphuric acid. It resembles the acetate of oxide of amyl in not presenting the characteristic agreeable fruity flavour in a pure state; it requires to be considerably diluted before the odour appears. This oil is largely manufactured in England, and is employed in the preparation of a beverage called pine-apple ale. The process commonly used for its preparation does not yield perfectly pure butyric ether. It consists in saponifying fresh butter with potash; the soap that forms is separated from the liquor, dissolved in strong

alcohol, and distilled with concentrated sulphuric acid. This yields a mixture of butyric ether, and various other ethers, but the liquid obtained is perfectly adapted for the purposes of flavouring.

Cognac Oil and Grape Oil.—Specimens of these oils, especially of the former, are contributed by English, French, and German manufacturers. They seem to be often employed with the view of giving ordinary varieties of brandy the prized flavour of genuine cognac. Unfortunately the samples exhibited are too small to permit of a careful analysis. A few superficial examinations proved undoubtedly that they are compounds of fusel oil dissolved in a large quantity of alcohol; and it is curious that a substance which is most carefully eliminated from brandy on account of its offensive flavour, should be introduced in another form and in minute quantities in order to render the same beverage aromatic.

Artificial Oil of Bitter-Almonds.—As early as 1834, Professor Mitscherlich of Berlin pointed out a peculiar liquid formed by the action of fuming nitric acid upon benzole, and possessing the odour of natural oil of bitter almonds in a high degree. It was called nitro-benzide or nitro-benzole. The preparation of this compound was, however, too expensive to admit of its substitution for natural oil of bitter-almonds, as the sole sources of benzole, at that period, were the compression of oil-gas and the distillation of benzoic acid. In 1844, one of the Reporters* succeeded in demonstrating the presence of this substance in common light coal-tar-oil; and in 1849, C. B. Mansfield† showed, by a careful investigation, that benzole may be easily obtained in large quantities from tar-oil. In the French Department, under the fanciful title of "*Essence de mirbane*," the Reporters met with several specimens of oils, which on examination proved to be nitro-benzole of more or less purity; they were, however, unable to obtain any positive information as to the extent of this manufacture; but it does not appear to be very considerable. The method employed in England for its preparation was devised by Mr. Mansfield, and is very simple; his apparatus consists of a large glass tube in the form of a coil, which at the upper end divides into two tubes, each of which is provided with a funnel. A stream of concentrated nitric acid flows slowly into one of the funnels, and benzole, which for this purpose need not be perfectly pure, into the other. The two substances meet at the point of union of the two tubes, and chemical combination ensues with the evolution of much heat, but as the newly-formed compound flows down through the coil, it becomes cool, and is collected at the lower extremity. It then merely requires to be washed with water, and, lastly, with a dilute solution of carbonate of soda, to render it fit for use. Nitro-benzole is closely allied to oil of bitter-almonds in its physical characters, yet it presents a slight difference of odour which may be easily detected by an experienced person. It is very useful for perfuming soap, and is probably capable of application in confectionary and cookery, as its flavour resembles that of bitter-almonds, without containing any hydrocyanic (prussic) acid.

UNITED STATES OF AMERICA.

The greater portion of the soaps exhibited in the American section are transparent, the preparation of which requires the employment of a large quantity of

* Dr. Hofmann.—W. D. L. R.

† *Quarterly Journal of the Chemical Society*, vol. i., p. 244.

alcohol. This is sufficiently cheap in the United States to permit of its free use by the soap-maker in the production of toilet-soap. Transparent soap is there much esteemed, and forms an important article of commerce. There are Three Exhibitors of transparent, and One of other toilet-soaps, in the American Section, and also Four of soap for household or manufacturer's use.

The American spirituous perfumery, which was found to be inferior to that exhibited by other countries, is contributed by the makers of toilet-soaps. One Exhibitor sends only a tooth-wash or dentifrice.

AUSTRIA.

About 3,750 tons of olive-oil-soap, valued at 235,000*l.*, are manufactured annually in Austria, besides soap made with tallow and other fats. The two large stearic candle-works of Vienna, "Milly," and "Apollo," produce annually about 2,000 tons of oleic-acid-soap, as a secondary product. The chief manufactories of olive-oil-soap are situated in Venice and Trieste, from which latter place there is One contribution to the Exhibition; thus affording an opportunity of judging of the state in that locality of a manufacture which is mainly confined to southern Europe. It appears that lately the production of olive-oil-soap has much decreased in Austria, but this must be attributable to other causes than a deterioration in its quality, which was found most excellent. There are Two contributors of this and other soaps, both of whom have exhibited the floating or froth soap.

The only Exhibitor of perfumery, JOHN MARIA FARINA (748), sent Eau-de-Cologne, which was so liberally distributed by means of a small fountain, that the supply in charge of the attendant was exhausted before the Jury had made the Awards, so that only the residue left in the fountain was submitted to them. As the specimen had evidently lost much of its perfume from exposure to the air, the Reporters, at the request of the Austrian Commissioner M. C. Buschek, and with the sanction of the Executive, examined, subsequently, a fresh sample, which was taken from a cask of Eau-de-Cologne which had remained under the care of the Customs, and which had been overlooked by the attendant. This sample was found to be equal in quality to the Eau-de-Cologne rewarded with Honourable Mention.

BELGIUM.

It is very remarkable that Belgium has sent to the Exhibition no green, soft-soap (potash-soap), for which it has been famous from a very early period, and which, at one time, was an important article of exportation. Even now it is produced to a far greater extent than the hard soda-soap, the manufacture of which was commenced but a few years since, for the preparation of toilet-soaps. There is only One Exhibitor in the Belgian Section, and he sends toilet-soap only.

BRITISH COLONIES.

The British colonies have not yet progressed sufficiently in the art of soap-making to compete successfully with the world, as regards quality; at the same time it must be stated that their productions are, in most cases, creditable. The yellow soap from *Canada* possesses a most disagreeable odour; the fancy soaps are likewise badly made, giving no lather whatever. The *Cape of Good Hope* sends

a specimen of well-made yellow-soap from J. SMITHERS. *India* has contributed soap from Malabar, composed of cocoa-nut-oil and soda, and made up into irregular balls and long bars; this soap contains an excess of alkali, which effloresces at the surface, and is in general a very crude production. From Madras there is a specimen of well-made marine-soap manufactured by F. KEY; and from *Ceylon* ornamented soap, called olas-soap, manufactured at Kandy from cocoa-nut-oil. *New South Wales* sends very creditable specimens manufactured at Bathurst, 140 miles from Sydney; the collection comprises yellow, curd, and toilet soaps. *Nova Scotia* contributes very good yellow soap manufactured by — CLARKE, of Halifax. *New Zealand*.—J. A. SMITH exhibits good soap made in Auckland. *South Australia*.—The specimens from this colony are all of yellow-soap, which was made by W. H. BURFORD, who is noticed in the List of Awards. *Van Diemen's Land* sends samples of good household soap, made by R. CLEBURNE, of Hobart Town. The *West Coast of Africa* sends specimens, which are interesting, as having been manufactured on the Oil-coast; they consist of soap made with a mixture of palm-oil and palm-kernel-oil, some made entirely with palm-kernel-oil, and soap made with ground-nut-oil. The oils used in their production are likewise exhibited.

EGYPT

A few interesting and excellent specimens of perfumery have been sent from Egypt, comprising Rose-water of Fayoum, Orange-flower-water, and Mint-water of Rosetta.

FRANCE

Although modern discoveries in chemical science, by furnishing a cheap substitute for barilla, have deprived Marseilles of some of its local advantages, this town is still the chief centre of the soap-manufacture in France, and from its position in the midst of the oil-producing countries, it is likely for a long period to retain the high reputation which for ages it has enjoyed for the olive-oil-soap to which it has given its name.

At one period Marseilles supplied the whole of France with soaps, in addition to large quantities exported to all parts of the world; but this privilege is becoming gradually curtailed by the establishment, round Paris, and other large towns, of soap-manufactories, in which tallow, palm-oil, and other fats, are employed in lieu of olive-oil; besides which nearly all the stearic-candle-makers convert their oleic acid into scouring and household soaps.*

The Parisian perfumers produce excellent toilet-soaps by the "large-boiler-process," remarkable for the fragrancy of the perfume, and giving a good lather. In many cases toilet-soap is manufactured by the "cold-process," and is generally of an inferior quality, giving only a disagreeable slime when used in washing; there are, however, samples in the Exhibition free from this defect.

Many French people never use soap to their faces, employing as a substitute aromatic vinegar, a few drops of which are added to the water used in washing.

* M. E. Péligot has proposed to use the oleic acid of the stearic works for the scouring of wool, because it may be readily removed by carbonate of soda. This valuable plan does not appear to have met with the encouragement it deserves, more especially out of France.

Hence the "vinaigre-de-toilette" is an important manufacture, which is chiefly monopolized by Paris, whence it is sent to all parts of France. There are Three Exhibitors of this aromatic vinegar.

Spirituous perfumery is prepared in great perfection by the manufacturers of Paris, some of whom distil their own essential oils; they generally, also, combine with it the manufacture of toilet-soaps, and hence, with a few exceptions, toilet-soaps and perfumery are exhibited together, and have been conjointly rewarded. In the preparation of essential oils, the flowers are placed in a still, with water, and distilled. The vapour of the water carries over with it that of the essential oil, and both condense together, the essential oil swimming on the surface of the water, which, however, always retains a minute portion in solution. To recover this, the water is usually returned to the still and again passed over; M. Piver, one of the French exhibitors, however, instead of so doing, employs the water for the perfuming of pomatum and hair-oil, which, from their attraction for essential oils, withdraw them from the water.

In 1847 there were, it appears,* 110 perfumers in Paris, employing 721 work-people in the manufacture of toilet-soaps, cosmetics, essential-oils, and spirituous and aqueous perfumery, the value of whose productions was 389,680*l*. The workmen earned, on the average, 2*s*. 7*d*. per day; the workwomen, 1*s*. 6*d*.

According to M. Natalis Rondot, 12,042,970 lbs. of soap, valued at 142,012*l*., were exported in 1850 from France, a quantity which, as will be hereafter seen, nearly equals that exported from Great Britain in the same year: besides which, 3,398,930 lbs. of perfumery, in value 431,638*l*., were also exported from France.

There are Two Exhibitors of artificial essences in France. One sends simply a series of compound flavourings, intended to imitate the savour of various fruits; the second exhibits two specimens of chemical compounds, namely, artificial essence of bitter-almonds and artificial essence of pine-apple. The Jury did not, however, meet with any confectionary or perfumery in the French Section in which they had been employed.

Of the Nine Exhibitors of soap in the French Section, Two represent Marseilles, and Six, Paris; and, with two exceptions, these manufacturers exhibit toilet soap only. There is likewise a small contribution of soap from Algiers.

GERMANY.

At one period all soap was manufactured in Germany by the *indirect*, or, as it was called, the *German method*; but this is now fast giving way to the direct method, and will probably be ultimately superseded entirely by it. The indirect method, the result of empirical trials, and perfected only by long practice, is perhaps the most beautiful of all plans for making soap; the formation of this substance depending on a series of reactions, which modern chemistry explains, while at the same time it fully confirms the correctness of the mode of procedure. Soap made on this plan is first prepared as a potash-soap by boiling the fats with a lye made with wood-ashes (a potash-lye), and is then decomposed, while still in the boiler, by the so-called *salting-process* (*Aussalzen*), which consists in adding a strong solution

* *Statistique de l'Industrie à Paris*, par MM. Say et Natalis Rondot. 2^{ème} partie, p. 829.

of common salt (muriate of soda) to it, not merely to separate the soap from the water, but in sufficient quantity to yield the requisite amount of soda to take the position of the potash. The two bases, soda and potash, exchange places; the stronger base, potash, combining with the muriatic acid, and forming muriate of potash (chloride of potassium), the soda combining with the fatty acids, and forming a soda-soap. At one time this plan was of great value to a country like Germany, removed from the source of barilla, and producing little or none herself. Modern chemistry, by furnishing an abundant supply of cheap soda, however, renders this circuitous plan of much less value, and it must therefore give way to the onward march of science.

The Zollverein States of Germany are represented by Four Exhibitors of soap. Three manufacture household and scouring soap of excellent quality; the other, toilet-soaps. Hamburg is represented by One Exhibitor of floating and other toilet-soaps.

The perfumers of Germany are in great force, being Eight in number, and reckoning two John Maria Farinas in their ranks, making no less than four Farinas in the Exhibition, all claiming to be the original. It appears that speculation is carried to so high a pitch in Cologne, that any child, entitled to the surname of Farina, is bargained for as soon as born, and christened Jean Maria; at times this event is even anticipated. The perfumery of Germany is generally very good.

HOLLAND

is represented by One soap-maker, who exhibits olive-oil-soap, and toilet-soap of fair quality.

PORTUGAL

sends the produce of the Royal Soap and Tobacco Contractor. The collection comprises olive-oil-soda-soap (Marseilles); rosin-and-tallow-soap (yellow-soap) and toilet-soaps, all of which are creditable.

RUSSIA.

There are only Two Exhibitors of soap in the Russian Section, one from St. Petersburg, the other from Warsaw. The latter sends very excellent toilet-soaps.

Russia possessed, in 1842, Sixty-four soap-manufactories, which produced soap valued at 205,800*l.*; and, in the government of Moscow, Three manufactories of perfumery, employing Fifteen workmen, which produced goods valued at 5,080*l.*

SPAIN.

The quantity of soap manufactured in Spain is very large, and exceeds that required for her home-consumption, a considerable portion being annually exported to the Spanish colonies. The common hard-soaps are those principally produced, and they are made by the "cold-process." The following is a list of the towns and provinces in which the manufacture is chiefly carried on, the figures indicating the number of manufactories, wherever it was ascertainable:—Badajoz; Cáceres; Cadiz 3; Burgos, 4; Gerona; Guadalajara, 2; Guipuzcoa; Huelva, 2; Huesca;

Jaen, more than 10; Logrono; Malaga, 7; Madrid; Navarre, 7; Oreuse; Port St. Maria, 1; Tarragona; Toledo, 4; Valencia; Seville, 12; Soria; Saragossa, 16; Xeres de la Frontera, 1. Madrid is represented by One Exhibitor of hard olive-oil-soap made by the "cold-process," which is sold at about a penny per pound less than that prepared in the ordinary manner. Malaga sends the produce of one of its manufactories, consisting of the ordinary mottled Castile-soap, made with barilla and olive-oil, in the large boiler, the colouring being obtained by sulphate of iron. This soap is very perfect, and is sold at the rate of 5*l.* 11*s.* 3*d.* per cwt., or almost exactly 1*s.* per pound. In 1843 Malaga produced 19,700,000 lbs. of soap; and in 1844, according to information collected on the spot by M. Natalis Rondot, Cadiz, Xeres, and Port St. Maria yielded 450,000 lbs.

SWITZERLAND.

The contributions from Switzerland consist merely of a small quantity of tooth-powder and hair-oil. It is stated that the tooth-powder is in general use, and is prepared from an indigenous stone, which is calcined and pulverized.

TUNIS.

The Tunisian soaps are composed of olive-oil and soda, and are made in every part of the Regency, generally in copper vessels, holding from 40 to 50 cwt. each. The soda-lye is prepared by mixing the crude soda with the necessary quantity of lime, and putting the mixture into a reservoir, when water is added; under the reservoir is a well which catches the caustic lye as it flows from a hole in the bottom; from the well it is transferred to a copper vessel, and mixed with a proportionate quantity of oil, and boiled until it is made either into a hard-soap, or into one of a softer sort. The price of the hard-soap is from 30*s.* to 32*s.* per cwt., according to that of the olive-oil; the soft-soap is about 25*s.* per cwt. Soap is a very important article of commerce in Tunis, and is generally used by the lowest classes, whose habits of cleanliness are remarkable. There are five specimens of soaps made into bars; a toilet-soap, moulded by putting it into a small brass cup; and a jar of soft-soap; all of which are of a very primitive make.

The Tunisian collection of perfumery consists of scented waters without any admixture of alcohol; they are prepared by distilling the flowers with water in a copper still. The *Ottos* of Tunis, which are obtained by repeated distillations, are prized as being more fragrant, and are consequently more costly, than those made in Eastern countries, the usual price being from 3*l.* 15*s.* to 5*l.* per ounce,* according to the description of flower from which they are obtained. Perfumery constitutes a most important branch of commerce in Tunis, a great quantity of scented waters being annually exported to France, Genoa, and Malta. There are also specimens of *Swak*, which is used by the Moorish women for whitening their teeth; and perfumed necklaces, noticed in the List of Awards.

* In documents published from time to time by the French Minister of Commerce, it is stated that the common otto-of-rose is sold in the bazaars at 5 piastres the mital: reckoning the mital at 4·78 grammes, or 73·774 troy grains, the avoirdupois ounce of 437·5 grains would cost 1*8s.*

TURKEY.

Turkey has sent a great variety of soaps, many of which are perfumed with musk, and ornamented with inscriptions; one kind, from Adrianople, is made up into hollow balls, containing a small bell, similar to those sometimes attached to the collars of horses; the Reporters could not, however, ascertain the purpose of the bell. The collection comprises soap from Adana, Adrianople, Candia, Jerusalem, Damascus, and Tripoli, besides a soft soap called Alicant soap. None of these soaps afford a good lather.

The perfumery consists of:—orange-flower water, and rose-water, both very fragrant; Teusouh or musk paste; Kouderma or pastilles, for burning in the Seraglio; Tensouh or musk-paste medallions, purses, and necklaces; and amber Tesbihs or Chaplets, made of a paste composed of various perfumes. As the names of the Exhibitors of these various articles are not given, and as it appears that the specimens were bought at the bazaars, they are included in one general Award to the Sultan.

TUSCANY.

Tuscany sends the produce of One Exhibitor, comprising olive-oil-soap, tallow-soap, and yellow-soap; the two former may vie with any in the Exhibition. But the yellow-soap is not equal to that of English manufacture. In 1848 Tuscany possessed Sixty manufactories of soap and candles.

UNITED KINGDOM.

In no country in the world is the manufacture of soap carried on to so large an extent as in the United Kingdom, in which there are Three hundred and twenty-nine makers, besides Sixty-eight soap-remelters (perfumers). Ireland not being subject to a duty on soap, there are no ready means of ascertaining the quantity which is there manufactured; but in Great Britain alone the production amounted in the year 1850 to 204,410,826 lbs., and yielded an Excise-duty of 1,299,232*l.* 10*s.* 2*d.* Of this quantity 12,555,493 lbs. were exported to foreign parts, the drawback on it being 82,308*l.* 18*s.* 9*d.* The total quantity consumed in Great Britain, therefore amounted to 191,855,333 lbs. Of this quantity 22,858,382 lbs. were used by manufacturers, on which the duty, amounting to 97,342*l.* 0*s.* 11*d.*, was remitted. This leaves the net revenue derived from the soap-duty at 1,119,581*l.* 10*s.* 6*d.*, after deducting the drawback and the remission to manufacturers. Deducting the quantity exported, and that used by manufacturers, it appears that 168,996,951 lbs., or, in round numbers, 75,445 tons, were consumed in 1850 for domestic use in Great Britain (making 8 lbs. 1 oz. each person); besides that manufactured and consumed in Ireland, of which there are no returns. The Excise-duty was first imposed in Great Britain in 1711, the rate being 1*d.* per pound. In 1713 it was raised to 1½*d.* per pound, and in 1782 the duty on hard-soap was fixed at 2½*d.*, and that on soft-soap at 1½*d.* per pound. In 1816 the duty on hard soap was raised to 3*d.* per pound, at which rate it was levied until May 31, 1833, when the duty was reduced to 1½*d.* per pound on hard-soap and 1*d.* per pound on soft-soap. The present duty is according to these rates, with an addition of 5 per cent. The collection of

this duty (notwithstanding the great improvement in the Excise-regulations of late years) places the British manufacturer under certain restrictions as to his operations, which prevent him from conveniently making toilet-soap. In order to obtain toilet-soap the ordinary soap has to undergo a second process of clarification, and, after having been perfumed, has to be made up in some presentable form ; it is this which has given rise to the business of the soap-remelter, who buys his soap of the maker, remelts, perfumes, and then makes it into tablets. Two Exhibitors, however, of toilet-soap, carry on all the operations in their works. In Ireland the perfumer generally makes his own soap by the "cold process;" and One Exhibitor sends toilet soap made in this way.

Several descriptions of fat are used by the British soap-maker, the principal one being tallow (prepared from the inside and outside fat of oxen and sheep), which is imported in large quantities from Russia, South America, and Australia, the produce of the two last-named countries being more generally employed. Palm-oil, rosin, and cocoa-nut-oil are likewise used, to which must be added bono-fat and a "kitchen-stuff." Kitchen or "rough stuff" is collected from private families, where it is usually the perquisite of the cook, who frequently adds a few candles and occasionally a potato in order to increase the weight. The kitchen-stuff is bought up by the stuff-collectors from the rag and oil shops, and then sold to the soap-maker, who melts it down previous to use.

Before the repeal of the duty on salt, large quantities of barilla (then the only source of carbonate of soda) were imported into this country from Sicily, Teneriffe, and Carthage for the use of the soap-maker; its repeal was most beneficial from the stimulus it gave to the manufacture of soda from sea-salt, destined soon to supply exclusively the wants of the soap-boiler, who after a short time discarded the impure barilla, which not only was much more costly, but had to be ground to powder in a horse or steam-mill, before the lyes could be prepared, the operation usually occupying two days; whereas the soda-ash (prepared in enormous quantities in Liverpool, Glasgow, and Newcastle), besides containing twice as much soda as the barilla, comes to him in a powdered state ready for immediate use, and enables him to prepare the lyes in a few hours.

Within the last three years the soap-manufacturer has been supplied with fine American rosin (colophony), very much purer and of a much paler colour than that of English make; from this cause yellow-soap has been much improved, and is now made of a beautiful pale yellow colour (primrose soap).

Yellow-soap, first manufactured in England, is that produced in the largest quantities, and is composed of tallow, rosin, and soda. Mottled-soap is next in importance, and is usually made from kitchen-stuff and soda. Curd-soap, which is used to a great extent by the cloth-manufacturers of Yorkshire, and the lace and stocking bleachers of Nottingham, is made with tallow and soda (100 lbs. of tallow yielding from 150 lbs. to 155 lbs. of perfect curd-soap). Besides these there are various other kinds, as, for example, palm-oil-soap, which is usually prepared as a component of yellow-soap; cocoa-nut-oil-soap; and other kinds prepared chiefly for exportation, in which a low price, unfortunately, is a more important consideration than a high quality.

Soft-soap is made with potash (instead of soda) and various kinds of oils; Greenland, Southern, and other fish-oils being generally employed, when the soap is

intended for the cloth-districts. There is usually a small quantity of tallow mixed with the oil, so as to produce the fig-like appearance common in soft-soap: this is due to the stearate of potash formed in consequence of this addition, and which is less deliquescent than oleate of potash. Sometimes lime is added to imitate the white particles, but it is easily detected on dissolving the soap in water.

At present very little soap is made in this country from olive-oil, partly because, since the alteration in the duty on foreign soap, its manufacture does not repay the soap-maker, and partly on account of the "London New Pharmacopœia" directing soft-soap to be used in lieu of "Castile-soap," as it is found to be better adapted for the retention of a proper degree of moisture in pharmaceutical preparations.

Of the 329 soap-makers of the United Kingdom, only Seven come forward to represent the soap-trade. On comparing the productions of other nations with theirs, it is evident that, as regards tallow, palm-oil, and resin-soaps, the British soaps are generally better manufactured, notwithstanding the excise-restrictions under which the English manufacturer labours.

The English toilet-soaps are in no respect inferior to those of other countries, and are generally far superior in their detergent qualities, on account of their being made from soap manufactured exclusively by the "large-boiler process." The high reputation of the so-called Windsor-soap in all civilized states is an ample testimony of the estimation in which English toilet-soap is held by the makers of other countries, who adopt its name for any sort they wish particularly to recommend. The preparation of toilet-soaps is generally confined to the remelter, who perfumes and ornaments them in various ways. The marbling is effected by rubbing up the colours, such as vermilion or ultramarine, with a little olive-oil or soap, and taking a small portion on a palette-knife, which is pushed through the melted mass, and moved about according to the fancy of the operator. Many soaps are coloured throughout their mass with mineral colours. Vermilion is used to produce the pink colour of rose-soap, artificial ultramarine to produce blue, and various ochres to produce browns. Tablets are made by placing a soft mass of soap into a mould, fixed in a lever-press, and composed of a top and bottom die, which fit into a loose ring; by a rapid pressure the shapeless mass takes the form of the ring, and is at the same time embossed on the top and bottom of the cake. The ornamenting by means of coloured cameos is effected in a similar manner, but requires two presses, one of which forms the cake, and makes depressions for the reception of a different coloured soap, which is filled in by hand, and the cake is then placed in the second press, which embosses the coloured portion.

No less than Twelve out of the Sixty-eight soap-remelters of Great Britain exhibit. Most of them send also perfumery; and Eight manufacturers, besides the Twelve above named, exhibit perfumery only. The English perfumery was found in many cases to be very fragrant and agreeable, but in others the employment of an excess of some strong-smelling essential oil rendered the compound anything but a desirable article for the toilet. The Imports of Perfumery into the United Kingdom in the year 1850 were valued at 1,907*l.*, and a duty was paid of 191*l.*, but in all probability some spirituous perfumes are included under the head of "Oils, chemical, essential, and perfumed," of which 172,139 lbs. were imported and which yielded a duty of 12,772*l.*

Two Exhibitors have contributed specimens to which allusion has been made in

the preceding pages, and to which a great degree of interest attaches, as being among the first attempts at the application of harmless chemical compounds for the imitation of the flavours of fruits and liqueurs, namely, Oil-of-Pears, Oil-of-Apples, Oil-of-Pine-apples, Oil-of-Cognac, Oil-of-Grapes, and Onion-Sauce.

There are Ninety-five Exhibitors of Soap and Perfumery; of this number Sixty-two are solely or chiefly manufacturers of soap, and Thirty-three solely or chiefly makers of perfumery, though many of the perfumers send both soap and perfumery. Of those who exhibit soap, Seven (English) are merely remelters and perfumers of the goods they purchase of the soap-boilers; Five are makers of a floating or foam-soap; and Four exhibit soap made by the "Cold-process."

Among the perfumers there are Two who exhibit savory sauces, and Five, the artificial essences before described.

Of the Ninety-five Exhibitors there are—

31	Holders of a Prize Medal.
18	Who obtained Honourable Mention.
46	Unrewarded.

95

The number of Exhibitors from the various countries is as follows :—

America, United States	-	-	-	9	France and Algiers	-	-	-	14
Austria	-	-	-	4	Germany, Zollverein and North Ger-	-	-	-	4
Belgium	-	-	-	1	many	-	-	-	13
British Colonies :—					Holland	-	-	-	1
Canada	-	-	-	2	Portugal	-	-	-	1
Ceylon	-	-	-	1	Russia	-	-	-	2
Cape of Good Hope	-	-	-	1	Spain	-	-	-	2
India	-	-	-	2	Switzerland	-	-	-	1
New South Wales	-	-	-	1	Tunis	-	-	-	2
Nova Scotia	-	-	-	1	Turkey	-	-	-	3
New Zealand	-	-	-	1	Tuscany	-	-	-	1
South Australia	-	-	-	1	United Kingdom	-	-	-	27
Van Diemen's Land	-	-	-	1					—
West Coast of Africa	-	-	-	2					95
Egypt	-	-	-	1					—

Besides this number, Eight stearic-candle makers have also sent soap made with the oleic acid, derived as a secondary product from their manufacture: these eight raise the number to One hundred and three, but no special notice will be given of their productions in this portion of the Report.

LIST OF AWARDS.

ALLARD and CLAYE, Paris (France, No. 750). Prize Medal. A collection of fancy Toilet-soaps, in large blocks, marbled and otherwise ornamented; soap in cakes and balls; Potash-shaving-soap. These soaps are made in the ordinary manner, in the large boiler, and afterwards perfumed; they are most agreeable in use, giving very readily an abundant lather, and are free from an excess of alkali. Their perfumery is of various kinds, and very good.

ARNAVON, H., Marseilles (France, No. 402). Prize Medal. A very large collection of Marseilles mottled (Castile-soap), Yellow palm-oil, and Bleached palm-oil-soaps. The yellow soaps are not so slightly as those manufactured in England, but are good. The mottled Marseilles soap is, however, excellent.

BAZIN, XAVIER, Philadelphia (United States, No. 36). Prize Medal. A very large collection of fancy-soaps; Transparent-soaps, made up into cakes and balls; Transparent-shaving-paste; Hazel-nut-oil-soap; busts of American *savants*. The soaps are well manufactured, fragrant and agreeable.

Besides the above, various spirituous perfumes are exhibited, which are not included in the Award.

BLEUZE, H., Paris (France, No. 1091). Honourable Mention. Soaps and perfumery. The soaps are manufactured by the "cold-process," and they give a tolerable lather.

BURFORD, W. H. (South Australia, —). Honourable Mention for well-made Yellow-soap.

BUSCH, P. A. (Frankfort, No. 2). Honourable Mention for Rectified Cognac-oil.

CADWELL, PAYSON, and Co. (United States, No. 510). Prize Medal. A soap called Excelsior-soap, not very slightly, but possessed of remarkable detergent properties, especially in very strong brine. In the trial made with this soap, it was found to possess the valuable property of readily removing tar even in salt water, which renders it peculiarly well adapted for a Marine-soap. A comparative trial was made at the same time with scouring-soaps, selected from the best in the Exhibition; they all answered as well as the Excelsior-soap, except in the removal of tar when washing with a solution of salt.

Much stress was laid on the low price (30s. per cwt.) at which this soap may be produced; but as on examination it was found to contain earthy matters, with which any soap may be much reduced in cost, the lowness of the price did not influence the Jury in their Award.

CHIOZZA, C. L., and SON, Trieste (Austria, No. 43). Prize Medal. Soaps of excellent quality and in great variety. Superfine Marseilles; Blue-marbled; Floating white-Genoa; Hard imitation English soap; Cocoa-nut-oil-soap; common Floating rose-coloured soap; white Curd-soap, for toilet purposes, also Blue and Red-marbled; Cocoa-nut-oil toilet-soap; besides various scented soaps; all of which afford an excellent lather, and are, in every respect, carefully manufactured, and free from an excess of alkali.

CLEAVER, F. S., 18 Red Lion Square (Class XXIX., 20). Prize Medal. Mr. Cleaver is a soap perfumer and remelter; his large and varied collection comprises the following descriptions:—Honey-toilet-soap; this soap contains no honey; it is perfumed with the essence of citronelle, and is a very agreeable toilet-soap. May-blossom-soap is a honey-soap containing cream of tartar. Peach-blossom-soap is a composition flavoured with oil of bitter almonds, and made up into balls, which derives a peculiar peach-like partial stain from the addition solely of cream of tartar. Soaps marked by Dunn's process of lettering, which consists in stamping recesses of the shape of the letters, and filling them with soap of a different colour. (See page 1356.)

All the soaps are of most excellent quality, very fragrant, and afford a copious lather.

COLLAS, M. A., Paris (France, No. 801). Honourable Mention. (*The same Award by the Jury of Class II.*) Artificial essence of Bitter-almonds; artificial essence of Pine-apple. (See pages 1347 and 1348).

CONTI and SON, Leghorn (Tuscany, No. 23). Prize Medal. Olive-oil-soap (white Marseilles); Olive-oil-mottled-soap (Castile-soap); Tallow-curd-soap; most excellent in quality.

COWAN and SONS, 139 New Gravel Lane, Shadwell (Class XXIX., No. 19). Prize Medal. Pale-yellow-soap of very excellent quality; Curd-soap, most carefully prepared; Marine-soap, for washing in salt water. This collection, though comprising few varieties, is valuable from its showing the degree of excellence attainable in the art of soap-making.

DE LEON Y RICO, E., Madrid (Spain, No. 243). Honourable Mention. A very hard Olive-oil-soap, made in 24 hours, by the "cold-process." It affords a lather with some difficulty at first, but by the second day's use acquires a little moisture and then gives one more readily. This plan of making does not yield a soap equal to that of the "large-boiler-process," but the specimen is very good of its kind, and free from excess of alkali.

DOUGLAS, J. S., and SONS (Hamburg, No. 92). Prize Medal for Toilet-soaps, made from cocoa-nut-oil and soda (probably by the "cold-process"); Marbled-soap, made from tallow; likewise the Floating or froth-soap; all of which are of good quality. This latter, in the true spirit of puffing, is alleged to be made according to a recipe which a friend transmitted from China, and which he obtained by bribery, on penetrating into the Imperial Soap-Manufactory of Canton.

EDE and Co., 47, Ludgate Hill (Class XXIX., No. 18). Honourable Mention for a case containing Perfumery of various kinds. The imitation of the scent of flowers was found in many cases to be successful.

FARINA, JOHN MARIA, 23 Rhein Strasse, Cologne, and 1 Salters' Hall, Cannon Street, London (Class XXIX., No. 21). Honourable Mention. For a long period after the opening of the Exhibition, Mr. Farina distributed his fragrant Eau-de-Cologne, with great liberality, by means of a fountain.

The specimens exhibited in bottles were of excellent quality, evaporating perfectly without resinous residue.

FARINA, JOHN MARIA, Cologne (Prussia, No. 426). Honourable Mention. Very fragrant and agreeable Eau-de-Cologne, evaporating perfectly without resinous residue.

FARINA, JOHN MARIA, opposite the Julichs Place, Cologne (Prussia, No. 858). Prize Medal. Eau-de-Cologne of most excellent quality, possessing in a high degree that fragrance and freedom from unpleasant residuary odour for which this article of toilet is esteemed.

FARINA, JOHN MARIA (Austria, No. 748). Honourable Mention. (See Introductory matter, Austria, page 1349.)

FISHER, T. W., and Co., King's Head Court, Barbican (Class XXIX., No. 22). Honourable Mention. Three cases of perfumes, and a sauce known as Harvey's sauce. The Jury accord an Honourable Mention of the perfumery, which is fragrant and leaves no residuary unpleasant odour after evaporation.

GELLÉ and Co., Paris (France, No. 845). Prize Medal. For a very large collection of fancy Toilet-soaps, made by the small-boiler, or *cold-process*,

and free from the defect of not giving a lather, which is usually the case with soaps made in this way. And also, for an assortment of very agreeable perfumery.

GIBBS, D. and W., Milton Street (Class XXIX., No. 305A). Prize Medal. These Exhibitors are among the few British soap-boilers who also perfume their soaps for toilet-purposes. Their soaps for manufacturers' use comprise :—a perfectly neutral Curd-soap, employed by woollen and silk manufacturers for the more delicate goods ; soap used by silk-dyers to give brilliancy to their goods ; and a Black soft-soap, made from the fats recovered by Mr. Bauwens, from waste lyes (see the article on Candles, page 1393) : it is chiefly used for scouring coarse wools and carpets, and is sold wholesale at 2*d.* per lb. The household soaps comprise White-curd of excellent quality ; Mottled equally good ; and very fine Pale-yellow-soaps. The Toilet-soaps exhibited are chiefly those ornamented with inlaid, embossed, and coloured cameos. They are well perfumed, and give a good lather. The Shaving-tablet, contained in a gutta percha case with a moveable bottom, is one of the very best possible contrivances for that purpose.

GIRÓ, JUAN, Malaga (Spain, No. 244). Honourable Mention. Three bars of Olive-oil-mottled or Castile-soap, made in the ordinary manner, in the large boiler. The alkali used in its formation is barilla, which, as before stated, was at one time the only source of carbonate of soda ; but it is almost entirely superseded in other parts of Europe by that prepared from sea-salt.

GROSSMITH, JOHN, 39 Friday Street (Class XXIX., No. 13). Prize Medal. The Jury award a Prize Medal to this Exhibitor for his Perfumery and the manufacture of Artificial-essences applicable to the flavouring of confectionary and other purposes ; for instance, Pine-apple, Jargonelle, Onion, Oil-of-Cognac ; these artificial essential oils are generally used in the proportion of 1 oz. to a gallon of spirit. (See pages 1347, 1348.)

HAUEL, JULES, Philadelphia (United States, No. 4). Prize Medal. Olive-oil-soap, Transparent-toilet-soaps, very agreeable and well manufactured. They afford a good lather.

The Perfumery which is exhibited is not included in the Award.

HENDRIE, ROBERT, Tichborne Street (Class XXIX., No. 10). Prize Medal. A collection of soaps, amongst which are some curious matters. Brown-Windsor-soap ; Amber-soap containing amber-oil ; Wax-soap used to mix with colours for distemper painting ; Petrolino-soap prepared with a mixture of 30 per cent. of Barbadoes tar, and 70 per cent. of soap ; this soap is intended to be used as a remedy in cutaneous affections. Benzo-amygdaline-soap, which is a soap prepared with a mixture of almond-meal and gum-benzoin.

M. Hendrie exhibits likewise a large collection of very good Perfumery.

The Jury have not pretended to discuss the merits of the unusual compounds ; but make their Award on the general excellence of Mr. Hendrie's Perfumery and Toilet-soaps.

KENDALL and Co., Dublin (Class XXIX., No. 25). Prize Medal. These manufacturers have exhibited two cases containing twelve very large blocks of Marbled-soaps, besides sixty boxes of various Fancy-soaps. All the soaps are made by the "cold-process," and consequently contain the glycerin resulting from the saponification of the fat. The materials used in their formation are lard, and a

very pure soda-lye. Great care has been bestowed by Messrs Kondall and Co. in the manufacture of these soaps.

KNIGHT, JOHN, 9 Old Gravel Lane, St. George's (Class XXIX., No. 8). Prize Medal. Most excellent Primrose or Pale-yellow-soap, made with tallow, American rosin, and soda; Mottled tallow-soap for household purposes, equally good; Soft or potash-soap, having the fig-like appearance, which is much esteemed as an indication of careful manufacture.

LONDON and Co., Paris (France, No. 1290). Honourable Mention for Aromatic-vinegar for toilet purposes, very refreshing, and free from adhesive residuo on evaporation.

LANGDALE, EDWARD F., 83 Upper Thames Street (Class XXIX., No. 55). Honourable Mention. A collection of Artificial-essences, now much used for flavouring confectionary and beverages, consisting of the following,—Oil-of-Cognac, Oil-of-Pears, Oil-of-Apples, Oil-of-Pine-apples, Oil-of-Grapes. The Jury accord an Honourable Mention to this exhibitor, for the successful preparation of these various ethers applicable as a substitute for natural fruits. (See pages 1347, 1348.)

LEISTNER, G. L., Paris (France, No. 908). Prize Medal. Excellent Aromatic or Toilet-vinegar; Creosote; Eau-de-Paris, a fragrant and agreeable perfume, resembling Eau-de-Cologne, but possessing a characteristic odour of its own.

LIIP, FREDERICK VON, Düsseldorf (Prussia, No. 658). Honourable Mention. For an agreeable perfume, called Düsseldorf water.

MARTIN, MARIA CLEMENTINE, Nun at Cologne (Prussia, No. 425). Prize Medal. Eau-de-Cologne of very superior quality, being that which was considered the most fragrant and agreeable in the Exhibition. The same odour was found to be persistent throughout the evaporation of a small portion, none of the essential oils becoming distinguishable, which is frequently the case with the inferior descriptions. Also Melisse Carmelite spirit, or holy water (alcohol).

MELZER, D., Hermannstadt (Austria, No. 44). Honourable Mention. The Jury accord an Honourable Mention to the Olive-oil-soap, Fanny-soaps and Floating-soap, which are of fair quality.

MILLIAU, jun., Marseilles (France, No. 929). Prize Medal. White Marseilles or Olive-oil soap. This is a good specimen of the kind to which Marseilles gives its name, and for which it is celebrated.

OGER, J. L. M. (France, No. 939). Prize Medal. Collection of Household and Toilet-soaps in bars and cakes. The household-soaps are excellent, and the toilet-soaps agreeably perfumed; one of these, the Jasper-soap, has a very peculiar jasper-like mottling, not seen in English soaps. The collection also comprises Floating-soap; white Marseilles or olive-oil-soap; tallow or Curd-soap; rosin or Yellow-soap. This collection is very important, and highly interesting, and consists entirely of soaps of the very highest class.

PALIS, A., Berlin (Prussia, No. 263). Prize Medal. Palm-oil-soap and tallow Mottled-soap (with a peculiar wavy mottling), of excellent manufacture and great detergent power. Both the soaps are free from any efflorescence of mineral salts, although they have become very dry.

PEARS, A. and F., 91 Great Russell Street, Bloomsbury (Class XXIX., No. 24). Honourable Mention. The Jury accord an Honourable Mention to Messrs. Pears for a small collection of Transparent-soaps, the manufacture of which they allege

their Father invented upwards of 40 years since. The Jury tried one ball of the soap which was stated to be twenty-five years old, and found it, though much darker in colour, to be very good. The price of spirit of wine in this country has prevented Messrs. Pears from obtaining a very large sale for this soap, but in America its manufacture is carried on to a considerable extent.

PIVER, L. T., Paris (France, No. 1678). Prize Medal. Various kinds of Toilet-soap; spirituous Perfumery; perfumed Hair-oil and Pomatum; Transparent-potash-soap or Shaving-paste. Two soaps are especially deserving of notice, that called Lettuce-soap, and the Orange-flower-soap, as being perhaps even more agreeable than the others. All M. Piver's perfumes and soaps are of the very highest class.

RIMMEL, E., 39 Gerrard Street, Soho, and Paris (Class XXIX., No. 3). Honourable Mention. The Jury accord an Honourable Mention for the Perfumery exhibited, which is of good quality. Besides these there are Hair-dye, Perfumed-bouquets, Pomatum, &c.

SARRE, H. Jun., Berlin (Prussia, No. 255). Prize Medal. A block of Palm-oil-soap, and Tallow-curd-soap, well manufactured, of great detergent power, and free from any efflorescence.

STIER, H., Warsaw (Russia, No. 364). Prize Medal for Brown-Windsor-soap, Floating, and other Toilet-soaps, well manufactured and very agreeable.

It is curious to find that the name "Brown Windsor" should have been adopted even in so distant a locality as Warsaw. The soap, moreover, has a great resemblance to that manufactured in this country.

TAYLOR, H. P. and W. C., Philadelphia (United States, No. 292). Prize Medal. A very large collection of Transparent-soaps, some of which are quaintly arranged to form a window, in imitation of stained glass. They are very agreeable, and afford an excellent lather.

TAYLOR and SON, King's Road, Chelsea (Class XXIX., No. 5). Prize Medal. These Exhibitors are perfumers of the soaps which they buy of the soap-boiler, and they have carried to great perfection the art of perfuming and mixing the various sorts of soap so as to produce agreeable compounds for the toilet. The "Old Brown-Windsor-soap" is particularly to be distinguished as one of great excellence. The other soaps are Almond, Otto-of-rose, Lavender, Honey, and Shaving. Besides soaps, Messrs. Taylor and Son exhibit spirituous and aqueous Perfumes, of which they are the distillers, and which possess the fragrance of the respective flowers. The Rose-water, Elder-flower-water, and spirituous Lavender-water, may be cited as examples of great excellence. The spirituous perfumes comprise "Pure Lavender-water," "Perfumed Lavender-water," Millefleurs and Eau-de-Cologne; the aqueous perfumes are, Rose-water, Honey-water, Peppermint-water, and Dill-seed-water.

TROLLON, Grenoble (France, No. 1701). Honourable Mention. Concentrated essences for flavouring liquors; these are very numerous; some resemble the flavours of the fruits which they are intended to imitate, whilst others require a little imagination on the part of the epicure.

TOUCHE-GILLÉS, E., St. Laurent, Antwerp (Belgium, No. 434). Prize Medal. Excellent Toilet-soaps, affording a very abundant lather. The collection comprises very good Olive-oil, or Marseilles soap; tallow, or Antwerp soap; marbled

Antwerp soap; lard Toilet-soap; scented Palm-oil-soap, which is most agreeable for the toilet; also a toilet-soap called "*Savon d'adoucisement*" (emollient soap).

BEY OF TUNIS (Tunis, Nos. 53 to 57). Prize Medal. A collection of a variety of Perfumed-waters (not spirituous). There are Ninety bottles of these perfumes, amongst which may be cited, Rose-water, Quince-water, Apple-water, Musk-water, Jasmine-water, which is very fragrant; Millefleurs-water, composed of jasmine and other perfumes; White-rose-water, Aloe-water, Benzoin-water, Citron-water, Cinnamon-water, Caraway-water, Orange-flower-water, water distilled with a mixture of benzoin and other perfumes, Cedar-wood-water. Also perfumed Tablets and Necklaces worn by ladies; these are composed of a paste made of amber, musk, and aloe. Likewise jasmine pomatum.

The greater portion of the perfumed waters are very fragrant; some few are peculiar, and to persons unaccustomed to their use, not agreeable.

WILLIAMS, JOHN and SON, 28 Compton Street, Clerkenwell (Class XXIX., No. 4). Prize Medal. A collection of soaps for manufacturing and household purposes, and also perfumed toilet-soaps. These Exhibitors are soap-boilers, as well as soap-perfumers, a combination of two, generally, distinct branches. Their common soaps are exceedingly well manufactured, and are possessed of great detergent properties. The collection comprises, Olive-oil-soap, which is much used by the fine-cloth manufacturers; White-curd- (tallow) soap, used principally by the lace-bleachers; Pale-yellow and Mottled-soap, for household purposes; Scouring-soap, containing designedly an excess of alkali, which effloresces on the surface; this soap is made chiefly for consumption at Leicester. It answered well for washing in a strong brine, and therefore might be used on board ship.

The fancy-soaps are agreeably perfumed, and give readily an abundant lather. The principal description of toilet-soaps are, Brown-Windsor, Rose-soap, and the so-called Honey soap.

WUNDER, L., Liegnitz (Prussia, No. 250). Prize Medal. Tallow-soap, with a peculiar wavy mottling, very well manufactured; Palm-oil soap, of good quality, and excellent white Curd-soap; the Award is to the foregoing. Besides these, there is a toilet-soap called Ananas-soap, the perfume of which does not at all resemble that of the pine-apple, and is moreover very disagreeable.

YARDLEY and STATHAM, Vine Street (Class XXIX., No. 2). Honourable Mention. A soap called the "genuine Honey-soap," is very good, and gives an excellent lather, but it does not contain any honey. At one time honey was put into toilet-soap, but was discontinued in consequence of the unsightly appearance it produced; the name, however, is still retained. The other soaps exhibited are, the "True Winter-soap," Heliotrope-soap, White and Brown Windsor-soap, which are equally good.

Many of the Toilet-soaps are stated to have some peculiar emollient and whitening effects on the skin; it is, however, to be hoped that the public will soon become sufficiently enlightened to buy the soaps for their real and not for their fabulous qualities.

II.—CANDLES.

In tracing the little which is known respecting the early history of Candles, it is impossible to avoid the mention of Lamps also (although these were not amongst the

articles submitted to the consideration of this Jury), as both are intimately connected, not only in their history, but also in their philosophical bearings; for however much candles and lamps may differ in other respects, they are identical in this, that both are contrivances in which, for the purposes of illumination, a wick of fibrous material is employed to effect the combustion of fatty bodies; which, for the most part, under ordinary circumstances, could be ignited only with difficulty, and if ignited, would soon become extinguished. The chief point of difference is, that in the lamp the fuel is a fluid, at the common temperature; whilst in the candle it is liquified only gradually, and in the required quantity, by the heat of the flame. This distinction, however, does not entirely hold good, for it is known that in many countries, especially in those where oil-yielding plants are not common, animal-fat is employed for feeding lamps; and it is even probable that the ancient Hebrews may likewise have used occasionally solid fats for the same purpose. The modern mortar night-light is also a lamp of this kind.

Frequent mention is made of the candle in the Old and New Testaments, in metaphorical as well as literal significations: but from the description of the candlestick of gold which Moses made by the command of God, it is more than probable that the Hebrew expression translated "candle" really means lamp,* for in *Exodus* xxv., after the minute description of the form of the candlestick, with its six branches, it is said, at verse 37, "And thou shalt make the seven lamps thereof, that they may give light over against it." Again, in *Leviticus* xxiv., v. 4, the Lord directs that Aaron shall order the lamps upon the pure candlestick; and in verse 2 of the same chapter, the fuel used in the lamps is shown to have been olive-oil.

Torches† may be regarded as a coarse description of candles, which indeed possibly originated from them. They are mentioned also in Holy Writ, in a passage remarkable as being the only one in the New Testament where the *lantern* is spoken of (*John* xviii., v. 3): "Judas then having received a band of men and officers from the chief priests and Pharisees, cometh there with *lanterns* and *torches* and weapons."

The information respecting candles, mentioned in Pliny's *Natural History*, is very slight and ill-defined. That which is most to the present purpose is contained in book xiii., chap. 13, where, in describing the books reported to have been found in a perfect state of preservation in the grave of Numa, 535 years after his interment, the author states that they lay near a quadrangular stone in a box which was bound all over with *candles*, and to that defence their preservation is ascribed. From this passage it would appear that candles were employed in the earliest ages of the Roman history; and, inferentially, that they resembled in some degree either our longest wax-tapers, or else match-lights made of pitched rope, for short

* In Lane's *Manners and Customs of the Modern Egyptians* there is a description of a folding-lantern of waxed cloth, and the lamp which is put into it. This, in Arabic, is called *Chander'el*, with which our word candle may possibly have some connexion; for it is more than likely that the same word was used to designate in former times either lamps or candles.

† British Guiana has contributed an interesting specimen of Torch-wood from the River Demerara, which, when beaten so as to separate the fibre, is used for torches by the Indians. It is supposed to be obtained from a species of *Amyris* or *Leuca*.

candles could not have been bound round any object.* In describing in book xvi, chap. 37, the "brittle rushes" that grow in marshy districts, he says that they serve to thatch houses and make mats; and the pith of them, when the rind is peeled off, is used for making wicks for *watch-candles* and funeral-lights, to burn by dead bodies whilst they lie above ground. This description may be considered as referring to candles very similar to, if not identical with the modern rushlight; but as the fat used in their formation is not alluded to, nothing certain is known on the subject.† In book xix, chap. 1, when speaking of flax, Pliny remarks that the fibres nearest the rind are only fit for lamp and candle wicks; and in book xxxvii, chap. 3, that if the scrapings of amber are put into oil, they will burn and maintain light both longer and more clear than wicks made of the *best of flax*: from which it would appear that, although the refuse flax was usually appropriated to lamp and candle wicks, the best flax was sometimes used for them.

As regards the fuel used in lamps, in addition to the mention of oil, Pliny, in book xxxvi, chap. 15, states farther that the inhabitants of Sicily burned a kind of bitumen, resembling an unctuous or oily liquor, in their lamps; and that they collected it from the surface of a spring in the territory of Agrigentum. Although in book xxi, chap. 14, various kinds of bees'-wax are mentioned, and the method of wax-bleaching is minutely described, which, it may be remarked, somewhat resembles the process employed in the present day,—no allusion is made to the application of wax to the manufacture of candles; nor in speaking of tallow and other animal fats, and their separation from the cellular-tissue, is it stated that they were employed for candles.

From Fosbroke (*Encyc. Antiq.*, p. 472, 4to Edit.), who copiously refers to most of the best authorities elucidating this subject, the principal of which have been carefully examined for this Report, we learn that wax was employed by the classical ancients for candles; the wick was made of rope and leaves of the papyrus, and such candles were carried by children at marriages, and were used at funerals. And the same authority (p. 405) adds that their illuminations were made not only with lamps, but also with links and wax-flambeaux.‡ He states, moreover (p. 240), that the rich Romans used lamps, and the poor employed candles. Beckmann has recorded a notice that the Emperor Constantine, about the beginning of the fourth century, "caused the whole city of Constantinople to be illuminated with lamps and wax-candles on Christmas-Eve." (*Hist. of Inv.*, Bohn's Edit., ii. p. 174.) Apuleius distinguishes wax and tallow candles by the terms *Cerei* and *Sebacei*.

In the middle-ages, continues Fosbroke, wax-candles were made of various sizes,

* The same story is also related by Livy, lib. xl. c. 29, with the additional statement that the books were bound round in a package with two candles; which seems to indicate that flax formed into torches with pitch or wax, were employed, simply to hold the manuscripts together. These torches probably somewhat resembled the tarred string used for the purposes of illumination in the present time by workmen engaged at night in laying down gas or water pipes.

† The description of the Irish candles in Fosbroke's *Encyc. Ant.*, p. 240, however, throws much doubt upon this conclusion. It is there stated that they were formed like those of other nations, of peeled rushes dipped in butter or grease, and placed in *lamps of oil*. (Lewich, *Ireland*, 1790, p. 225.)

‡ *Annal. Tacit.* lib. iii. c. 9. Edit. Lipsa, p. 78, n. 21.

some exceedingly small, and others weighing so much as 50 lbs.; they were made in moulds, the wicks being formed of twisted tow. He likewise states that they were made at home in gentlemen's houses. Whilst describing the architecture of the Britons, Anglo-Saxons, &c., he mentions that *tapers*, ornamented with flowers,* were used on high festivals to burn before particular images, and be borne in procession. That wax-candles were not made in the Saxon period by regular chandlers as now, appears from the description in *Asser's Annals*, translated for Bohn's *Six Old English Chronicles*, p. 84, of King Alfred's device for marking the hours of the day, by the consumption of wax-candles; six of which, lighted in succession, burned exactly twenty-four hours. It there appears that "he commanded his chaplains to supply wax in sufficient quantity, and he caused it to be weighed in such a manner that when there was so much of it in the scales as would equal the weight of seventy-two pence, he caused the chaplains to make six candles thereof, each of equal length, so that each candle might have twelve divisions marked across it."

There can be no doubt, however, that the occupation of the wax-chandler existed in England at a very early period, as well for the manufacture of tapers for religious rites, as for the preserving of the bodies of important personages in waxed cloths, which was called *Cering* them. Hence the art was probably practised chiefly, if not exclusively, in monasteries; the tenants of which paid several of the rents in kind, and one of these was delivered in wax, and called *Cerage*. The persons whose office it was to make this wax into paste and tapers were termed *Ceragii* and *Cerarii*, and Ducange shows them to have existed so early as A.D. 779. In 1397, John of Gaunt, Duke of Lancaster, directs by his will that his body should be carried direct to the Friars-Carmelites in Fleet Street, but that there should "be no *cering* or embalming of his corpse;" indicating that this operation was probably even then performed by ecclesiastics. In 1495, however, a contemporaneous authority states that the Princess Elizabeth, daughter of Henry VII., "was cered by the wax-chandler." Ducange shows that *Candelarii*, or persons who made and sold candles, were known in the middle of the thirteenth century."

By the sixteenth century the trade of wax-chandler was probably extensively established in England. In Brand's *Popular Antiquities* (vol. i. p. 29, Edit. Knight), is an extract from the churchwarden's accounts of St. Martin Outwich, London, under the year 1510:—"Paid to Randolf Merchaunt, wax-chandler, for the Pascall, the Tapers affore the Rode, the Cross candelles, and Judas candelles, ix. iiij^d." In the *Memoirs of the last Two Years of the Reign of Charles I.*, by Sir Thomas Herbert and others (page 128), is described the night-light used in his chamber as "a cake of wax set in a silver basin, that then, as at other times, burned all night;" this description referring to the years 1646-1649 closely agrees with some of the forms of the modern mortar night-lights. Long coiled Wax-Tapers were manufactured in the 17th century in Venice, and the invention appears to have been brought to Paris about the middle of the same century by Pierre Blesimare, of that city.

* Some examples of wax-candles, ornamented in this manner, are exhibited in the Russian Department.

In the year 1775, the Rev. Gilbert White, in his *Natural History of Selborne*, pp. 198 and 199, 4to edit., describes the method of making Rushlights then practised by the cottagers of Hampshire, from which it might be inferred that they must have closely resembled those made by the ancients. A full abstract will be found in Tomlinson's *Cyclopædia*, p. 290, whence the following passage is taken :—"A pound of rushes (*Juncus effusus*), containing 1,600 individuals, was coated with 6 pounds of tallow, so that 228 lights weighed one pound, and cost a little over 5d. The rushes were peeled on three sides for the best lights, and on two only for watch-lights, which were not required to give so much light, and which, Gilbert White says, 'it is true only shed a dismal one—'darkness visible.'" Of the other kind he says, that "a good one, which measured 2 feet 4½ inches in length, burned 57 minutes;" and that he was assured by an experienced old housekeeper that 1½ lb. of rushes, after having been coated with tallow, completely supplied his family for a year. The cost of lighting with rushes he estimated at one farthing for 5½ hours, whilst a halfpenny candle in the "blowing" open rooms of the poorer cottagers only lasted 2 hours.

In the year 1799, William Bolts took out a patent in England for improving the form, quality, and use of the candle, the specification of which probably contains the first account of an attempt at the improvement of the quality of candles made from tallow and other animal fats, by subjecting the material to a considerable pressure during the act of cooling, and which, in effect, is the preparation of the so-called *Stearine* from fats. He likewise describes a solid candle with a short wick, which is placed in a holder, and kept pressed on the end of the candle by a spring, or else the candle is placed in a tube and pressed against the wick by a spiral spring; as well as other contrivances, some of which have been revived and successfully carried out in our own days.

The object of the preceding notices, incomplete as they are, is merely to enable the reader to form some idea of what may be gleaned relating to the various means of producing light at different periods, and especially regarding the construction and materials of the candle. Great interest, indeed, would be attached to a complete history of *Domestic Illumination*, tracing its gradual development from the solitary watch-lantern graven on the Pyramid, through the graceful but very imperfect lamps of the Greek and Roman period, as exhibited in our museums, and the clumsy contrivances of the middle-ages, up to the productions of modern times, satisfying the demands both of taste and science. In such a narrative might be shown the progress of light, in the literal signification of the word, by a careful examination of the various forms in which it has been at different times employed, as lamp, lantern, torch, flambeau, falot or cresset, candle, and gas; whether for the celebration of religious ceremonies, for increasing domestic comfort, adding to the security of the streets of towns, or forming a beacon to guide the mariner at night.* It would be, at the same time, a history glancing at the advancement which the improvements in illumination have given to the social condition of mankind; and at the advantages which science has derived from the study of this subject. Nor would entertainment or interest

* For a history of the "Lighting of Streets," the reader is referred to *Beckmann's Hist. Inv.* (Bohn, vol. ii., p. 172.)

be wanting in the recital of the many superstitions connected with the burning of lamps and candles; the shape of whose flame, trembling in the moving air, and whose wick, bending or spreading under the influence of heat, has been suggestive to human imagination from the time of Pliny up to the enlightened days of our own century. Such an inquiry, however, even were it possible with the time and the materials which are at the disposal of the Reporters, would far exceed the limits assigned to this Report. The same restriction as to space prevents them from following step by step all the various mechanical contrivances which have been invented in recent times to facilitate both the manufacture and combustion of candles. The Reporters cannot, however, refrain from entering into some details regarding the remarkable chemical improvements which have occurred within the last thirty years; especially since they possess the additional interest of being the result of investigations of a purely scientific character, undertaken without any view to their ultimate practical application. In the present day it is too much the custom to require an instantaneous practical result, much to the detriment of the persevering prosecution of abstract science: the numerous, brilliant, and continually occurring proofs of that most important truth are too often overlooked, that all truly scientific studies tend to increase, sooner or later, not only the intellectual, but also the physical wealth of nations; and materially benefit the world at large.

(a.)—*Tallow-Candles.*

The ordinary tallow-candle labours under many disadvantages, which are so well known that they scarcely require to be specified. It has an unpleasant odour, which becomes more marked whilst burning; and the attempts at supplying it with a self-consuming wick have been only partially successful on account of the low fusing-point of the tallow. The slightest draught, from the same reason, causes the tallow to melt in larger quantity than can be consumed by the burning wick, and it therefore gutters down; this renders the tallow-candle ill adapted for being carried about a house, as grease spots are apt to be produced which are very difficult of removal;* to which we may add that it cannot be handled without soiling the fingers.

The disagreeable smell of tallow-candles arises chiefly from the tallow being imperfectly purified; for if it contain a portion of the cellular tissue of the fat from which it is obtained, this putrifies and communicates the process of decomposition, like a ferment, to the fatty matter, which becomes rancid and evolves a most unpleasant odour. This is always the case with tallow as it occurs in commerce, which, although fit for the soap-boiler, is too impure to be employed by the candle-maker without clarification. The first step towards the improvement of tallow-candles was made in the recognition of this fact; more attention was in consequence bestowed upon the manner of purifying or "*Rendering*" the tallow, as it is called. In England the "*rendering*" is effected by melting the tallow in an open copper pan exposed to the direct action of the fire. After it has remained

* Common ether is one of the best vehicles for the dissolution and removal of oil or grease spots.

in a fused state for some time, the water which the fleshy particles contain evaporates, and they then rise to the surface and are skimmed off and pressed. The pressed cake is called "greaves," or "cracklings," and is used for feeding dogs. On the Continent, however, D'Arcet's method is now universally employed, which has also been adopted in Ireland: it consists in treating the raw tallow melted by steam-heat with very diluted sulphuric acid, for the purpose of destroying the cellular tissue. This method, besides being much safer, yields three per cent. more tallow than the older process; and though it does not entirely remove the smell, essentially improves it. The purification of the tallow at the same time induces an amelioration in the flame of the candle, more particularly in point of uniformity in the development of light; as the cause of the frequent obstruction of the wick during combustion by less combustible nitrogenous substances is removed.

Less success has attended the attempts to supersede snuffers, which still continue a necessary appendage to a candlestick with a tallow-candle. The plaited wick which, as we shall see farther on, followed in the wake of stearic candles, is not applicable to the tallow-candle without some special contrivance, as in curling over outside the flame (by which it becomes consumed) it causes the tallow to melt in such large quantities that a considerable guttering is the consequence. It is therefore necessary to protect the candle if a self-snuffing wick be employed; this is effected in Palmer's lamp. Here the candle is enclosed in a vertical metallic cylinder with a cap whose orifice is smaller than the candle; as the candle is consumed a spiral spring presses it upwards against the cap. This contrivance much resembles the plan proposed by W. Bolts in 1799, to which allusion has already been made.

The next improvement in the tallow-candle was effected by a reduction of the fusibility of the materials employed. This was first done by the same inventor, W. Bolts, but received farther development from Chevreul's researches. The observations of this celebrated chemist, to which we have already alluded in our article on soap, showed that all varieties of solid fats might be split into a solid crystalline fat (stearin and margarin) and an oily liquid (olein);* in his laboratory-experiments this separation was effected by means of solvents; but subsequently it was found that by attending to the *temperature* of the fat, it might for all practical purposes be produced equally well by pressure. Common tallow melts at between 37°-40° C. (99°-104° F.) The melting-point of stearin is 62° C. (144° F.) By removing a considerable portion of the olein from the tallow, its fusing-point was consequently raised, and thus a great evil removed. Candles have been repeatedly made of pressed tallow; they fairly deserve to be called stearin-candles, while those that now go by that name actually do not merit the appellation.

To prepare stearin tallow is melted and allowed to cool as gradually as possible, with constant agitation, so that the stearin and margarin may crystallize; at from 35° to 38° C. (95° to 100° F.) the mass becomes pasty, and is subjected to slow pressure in cloths. By repeating the operation, the stearin is obtained gradually of greater purity.

* The American Section contains several specimens of Olein obtained by pressing lard, which, under the commercial name of lard-oil, is exhibited at Nos. 18, 19, 208, 562.

Cocoa-nut-stearin is very largely employed in England to mix with stearic acid, to form composite candles, the neutral fat appearing to be better adapted for this purpose than the fat-acids which may be prepared from it; but on the Continent it is but little used.

As regards the employment of tallow-stearin, many obstacles have stood in the way of its development which might, there is little doubt, have been removed by persevering investigations, had not the more careful researches into the nature of the process of saponification of fats, and the separation of solid acids from the fatty bodies, the result of these researches, directed the inquiry into a new channel. When it was found that stearic acid fusing at 70°C . (158°F .) could be obtained from stearin fusing at 62°C . (144°F .), and margaric acid with a melting-point of 60°C . (140°F .) from margarin fusing at 47°C . (117°F .), while the oleic acid remained as fluid as the olein from which it was derived, it became evident that the difference in the fusing-points of the solid and liquid acids being so much greater, the separation of the former from the latter might be effected without difficulty. Thus the transition of the tallow-candle to the stearic candle was effected.

Tallow-candles are of two kinds, "dips" and "moulds." Dips are made by dipping the wick repeatedly in melted tallow; allowing a sufficient time to elapse between every operation, in order that each coat may consolidate.

Mould candles are usually made in pewter moulds, although glass moulds have been lately introduced. The mould consists of two parts, a cylinder and a conical cap, which is perforated to allow a passage for the wick. Several of these moulds are fixed in a wooden frame, the upper part being formed like a trough in which the open end of the mould is inserted, the capped end pointing downwards. To insert the wick, the frame is laid on its side, and a long wire with a hook at one end is passed through the hole in the cap; the wick is then attached to the hook by means of a loop which is formed in it; on pulling back the hook, the wick is drawn with it. A wire is now inserted across the top of the mould and through a loop at the other end of the wick; lastly the wick is drawn tight through the cap, and a small wedge of wood is inserted to keep it in its place. The moulds are filled by running the melted tallow into the trough, and are then allowed to cool until the next day.

There have been several improvements of late years in the mechanical arrangements for the manufacture of tallow-candles, which it would be difficult to describe clearly without engravings; these have tended much to lessen their cost, and consequently the consumption continues very considerable; still it may be expected, notwithstanding their moderate price, that they will be gradually superseded by the more elegant and harder candles of stearic acid, or of compounds of stearic acid with solid neutral fats, which have the advantage of being self-snuffing. As yet the general introduction of stearic candles is impeded by their price; but we may confidently hope that the progress of science will soon afford us the means of still farther reducing their cost of production, and thus render the use of the tallow-candle less frequent in the dwellings of the poorer classes of society, as it has already disappeared from the homes of the middle classes.

It is remarkable that the ordinary tallow-dip candle is not exhibited by any

nation whatever, although there must exist far more makers of this kind than of any other.

AUSTRIA.

This is the only foreign country which has contributed tallow mould-candles. They are sold at 19 kreuzers per Austrian, or 5½d. per English pound; which is a halfpenny more than that at which far superior candles may be bought for in Ireland.

BRITISH COLONIES.

Two colonies, namely *Nova Scotia* and *Van Diemen's Land*, have sent mould candles, in which there is, however, nothing remarkable.

UNITED KINGDOM.

The manufacture of tallow-candles in the United Kingdom still continues to be a most extensive trade, notwithstanding the increasing consumption of gas, and the introduction of stearic and composite candles. Prior to 1831, when the duty on candles was repealed, they yielded an important revenue in Great Britain, as may be seen from the following statement. The duty, it may be remarked, was first imposed in 1803, and continued at the same rates from that period until 1831, viz, 1d. per pound on tallow, and 3½d. per pound on wax or spermaceti candles. It did not extend to Ireland.

M'Culloch's Dictionary of Commerce, p. 228.

Years.	Tallow. lbs.	Duty. Per lb.	Wax. lbs.	Duty. Per lb.	Spermaceti. lbs.	Duty. Per lb.	Net Revenue. £. s. d.
1820	86,552,461	1d.	692,705	3½d.	193,463	3½d.	373,455 14 5
1821	93,816,346	"	697,196	"	165,647	"	395,911 8 7
1822	98,311,801	"	682,241	"	179,208	"	415,609 15 3
1823	102,461,879	"	694,194	"	180,401	"	433,537 15 8
1824	109,810,900	"	759,751	"	179,454	"	466,042 16 1
1825	114,187,550	"	851,570	"	206,377	"	485,014 8 9
1826	110,102,643	"	705,615	"	201,790	"	467,069 12 1
1827	114,939,578	"	715,655	"	226,277	"	487,318 5 4
1828	117,342,157	"	748,293	"	270,263	"	497,770 2 9
1829	115,156,808	"	746,052	"	503,683	"	489,059 1 9

In 1830 the number of candle-makers in Great Britain was 2,695, who paid 500,048l. 14s. 1d. duty; since the repeal of the duty no record has been kept of their number, but judging from the tallow imported, it cannot be less than in 1830.

Quantity of tallow entered for home-consumption in the United Kingdom in the last ten years :—

Years.	Cwts.	Years.	Cwts.
1841	1,241,278	1846	1,183,834
1842	1,030,960	1847	1,069,301
1843	1,174,945	1848	1,406,725
1844	1,061,039	1849	1,412,484
1845	1,191,896	1850	1,219,101

Detailed report of the Imports of Tallow into the United Kingdom in 1850 :—

Tallow Imported from—	Cwts.	Duty paid. £.
Russia - - - - -	803,697	60,278
British Settlements in Australia - -	179,567	752
United States of America - - -	32,523	2,439
South America - - - - -	184,321	13,824
Other parts - - - - -	18,993	977
Total - - - - -	1,219,101	78,270

Of Tallow-candles only 1,067 lbs. were imported in the same year.

In 1830 the quantity of Tallow Imported into the United Kingdom was 1,073,833 cwts.

There are Four Exhibitors of mould-candles, two English and two from Dublin. The Irish candles only are deserving of notice, and may be regarded as the perfection of tallow-candles; indeed it appears that the makers of Dublin have acquired a high reputation for mould-candles, by bestowing great care on the purification of their tallow and on the moulding.

The price of tallow-mould-candles is 5d. per lb. ; those with waxed wicks, 5½d. ; and the composite candles, formed of tallow and cocoa-nut-stearin, 8d. per lb.

(b.)—*Stearic Candles.*

With this term we designate the candles made from the isolated solid fatty acids in contradistinction to those consisting of pressed tallow or lard (stearin), although in commerce, both are called “stearine candles.” The manufacture of stearin-candles is on the decrease, and tallow is now very rarely pressed. The stearin from cocoa-nut-oil (cocin) is, however, still prepared in considerable quantities, and mixed with stearic acid, and manufactured into the numerous kinds of composite candles which are so generally used in England. Compared with other fats, the importation of cocoa-nut-oil is not large; the following is the detailed account for 1850, from which it will be seen that by far the largest quantity comes from India :—

Cocoa-nut-oil imported from—	Cocoa-nut-Oil imported into the United Kingdom in 1850.
	Cwts.
British Possessions in India - - -	85,096
British Settlements in Australia - -	6,315
Other Parts - - - - -	6,628
Total - - - - -	98,039
	Duty free.

The foundation upon which the manufacture of stearic acid candles is based is the saponification of fats, and the separation of the fatty acids from the soaps, which the beautiful researches of Chevreul have made known to us. It would, however, be an error to suppose that these investigations alone solved the difficulty. Seven years, in fact, elapsed after the publication of Chevreul's discoveries, before they were successfully applied; but this can be a matter of no surprise to those familiar with the establishment of a new industry, and who are aware of the immense chasm which separates the laboratory of the chemist from the work-

shop of the manufacturer: they only can comprehend fully the obstacles of all kinds that must be vanquished, in order to fructify a purely scientific germ, and render it a healthy and vigorous branch of art.

The first steps in the manufacture of stearic candles were surrounded by difficulties of all kinds which frequently clouded the prospects of the enterprising inventors. Chevreul's experiments were published as early as 1823; but the idea of making candles from the isolated fatty acids does not appear to have been matured until two years later. At this period Chevreul allied himself with his celebrated colleague Gay-Lussac, with the intention of applying his discoveries to the practical purposes of life. In the year 1825 these two chemists took out a patent in France for the manufacture of fatty acids, and their application to the making of candles. Gay-Lussac took out, moreover, a patent in England, in the name of his agent Moses Poole, on the 9th of June of the same year. The specification of these patents is highly interesting as evincing a remarkable sagacity on the part of the patentees in anticipating the progress of this branch of industry; they call in aid all the agents which have been adopted up to the present day, even including the distillation of fatty acids with the aid of steam, which has only been brought into practical operation within the last ten years. Nevertheless the proprietors of the patents derived no benefit from them. The processes which they employed resembled too closely the proceedings of the chemist in his laboratory, rendering their industrial execution too costly. Although lime was specified by Gay-Lussac for the saponification of the fat, the ordinary alkalies continued to be employed; and for decomposing the soap, hydrochloric acid was used, the alkaline salts of which were never completely separable from the fatty acids. In their French patent, Chevreul and Gay-Lussac even spoke of the necessity of cold and hot alcohol for the perfect purification of the stearo-margaric acid. If we compare this proceeding with the present practice, we perceive that it had yet to pass through various ordeals.

A formidable and unforeseen difficulty presented itself in the fact that the new stearic candles would not burn with the ordinary wick; a long series of experiments were necessary in order to construct a wick which would not sputter the fat during its combustion. Chevreul and Gay-Lussac succeeded in doing this in the course of 1825, and indeed the plan was specified in the English patent before spoken of; they endeavoured to secure their invention in France by a rider to their patent, but this was not done until another inventor had taken out a patent for a similar contrivance.

A discovery like the separation of the fatty acids necessarily excited in many minds the desire for its practical application. Almost immediately after the publication of Chevreul's work, Cambacérès, an *Ingenieur des Ponts et Chaussées*, appears to have directed his attention to the utilization of Chevreul's investigations; at all events he took out a *brevet* for the improvement of the wicks of stearic candles in February 1825, which was prior to the date of the rider to Chevreul and Gay-Lussac's patent in France, and that of Gay-Lussac's in England; the value of the patents of these chemists was, therefore, considerably reduced. Cambacérès' first plan was a hollow wick, but in May of the same year he patented the plaited and twisted wicks, by which snuffers were rendered superfluous. The tension of the separate threads of the plaited wick causes the portion which rises

from the candle to curl outwards, so that its point projects beyond the flame, and is rapidly consumed in the air that plays freely around it.

Camhacérés had observed that the wicks soon became clogged in the stearic candles, although this did not happen if they were used in ordinary tallow-candles; he ascribed this phenomenon to the formation of soaps produced by the action of the fatty acids on the carbonated alkali resulting from the combustion of the wick. Whatever may be the cause, he succeeded in removing the difficulty by treating the wick with dilute sulphuric acid: he supposed that the presence of this acid prevented the formation of soaps by combining with the alkalies in the ash to form sulphates.

Another essential improvement in this branch of industry was brought about by the introduction of the cheaper material, lime, as a saponifying agent, followed up by the decomposition of the lime-soap by dilute sulphuric acid. The merit of having *successfully* introduced the saponification by lime (*saponification calcaire*) belongs to De Milly, who has earned great praise by his contributions to the stearic manufacture. His plan formed part of the original patent of Chevreul and Gay-Lussac, and it redounds much to his credit that he brought a plan to bear which had failed in the hands of his illustrious predecessors. The saponification by lime, in an industrial sense, dates from 1831.

As the wicks were frequently corroded by the sulphuric acid used according to Camhacérés' preparation, De Milly, in 1836, took out a patent for employing the borate, phosphate, or sulphate of ammonia, for the same purpose. These improvements, and the endeavours of De Milly to promote the introduction of the new branch of industry in other countries, gradually caused its extension.

Nevertheless numerous difficulties still remained to be overcome. The limits of the present sketch will not permit us to do more than give the main features of the development of the stearic manufacture: we are unable, consequently, to trace year by year all the little improvements which have taken place; but we cannot avoid a short notice of the numerous experiments necessary to prevent the crystallization of the stearic acid during the moulding of the candles. The first attempt made was to introduce another acid; and though successful in its immediate object, the choice (arsenious acid) was an unhappy one, for it almost threatened the very existence of the youthful art. It is true that this deleterious substance was added in very minute quantities, yet it was entirely incompatible with health, and was soon prohibited on the Continent by authority, and in England by equally powerful public opinion. Here commenced all the manufacturer's troubles anew; in all directions he sought a substitute, and yet found none; at last, after innumerable experiments, and when almost driven to despair, he hit on two expedients—very simple when once found out—which answered as perfectly as the discarded plan. The means now employed are—the addition of a very minute quantity of wax to the stearic acid: a still more common plan is to allow the melted acid to cool down almost to the point of congelation before it is poured into the moulds, which are warmed to the same temperature as the fatty acids. The refrigeration and occasional stirring of the liquid fat produces a sort of liquid pulp which congeals in the moulds without crystallization.

Sulphuric saponification (saponification sulfurique).—While the stearic manufacture was gaining ground extensively, as we have indicated, a new art

sprung up during the last ten years, having the same objects, and being based on the same foundations, but seeking the attainment of the goal by entirely different means—we speak of the saponification of fat by means of concentrated sulphuric acid, and subsequent distillation of the resulting fatty acids.

The origin of this proceeding must undoubtedly be sought in Chevrel's work; still E. Frémy deserves the credit of having, in an important paper, perspicuously exhibited the relations of fats to sulphuric acid. He demonstrated, in a treatise which he published in 1836, that the action of powerful acids on fatty substances has a close analogy to that of the alkalies. Both reagents decompose the fat, but while the alkalies combine with the fats and set the glycerin free, the sulphuric acid combines both with the acids and the glycerin; thus we obtain conjugate sulpho-acids, sulpho-stearic, sulpho-margaric, and sulpho-oleic acids, on the one hand, and on the other sulpho-glyceric acid. The first three are of a very ephemeral character; water decomposes them into slightly modified fatty acids insoluble in water, and sulphuric acid, which, with the sulpho-glyceric acid, dissolves in the water.

To George Gwynne is due the merit of having first described a method of obtaining fatty acids by the sulphuric saponification of neutral fats, and subsequent distillation of the resulting products. In a patent obtained in March 1840, he describes very fully his proposed plan for effecting this object, which consisted in distilling *in vacuo* by means of an apparatus similar to that employed in sugar-refining; the difficulty of sustaining a good vacuum on the large scale was, however, found to present so many obstacles that the plan was subsequently abandoned. Mr. Gwynne proposed also to distil, in the same manner, fatty acids obtained by means of lime-saponification, and even to obtain fatty acids by the distillation of neutral fats.

George Clark also directed his attention to the practical application of Frémy's experiments. On the 5th November 1840, he took out a patent for utilizing the property of sulphuric acid in decomposing fats, but without having recourse to their subsequent distillation; the difficulty and cost, however, of purifying the fat after decomposition rendered the attempt unsuccessful, notwithstanding that the quantity of sulphuric acid proposed to be used was only one-fourth the weight of the fat, whilst Frémy employed, in his laboratory-experiments, double this quantity.

Farther experiments were still necessary to establish, on a firm footing, saponification by means of sulphuric acid, which ultimately again led to the adoption of an improved system of distillation. In the patent before mentioned, which Gay-Lussac took out in England, and which is distinguished by its comprehensive treatment of the question, the distillation of fatty matters is spoken of, and the remark incidentally made, that the process is much accelerated by the presence of moisture; this part of the specification was, however, never worked. Nearly sixteen years later, on the 22nd August 1841, Dubrunfaut obtained a patent in England, and about the same time likewise one in France, for the purification of fatty bodies and their distillation. The plan proposed by M. Dubrunfaut was to heat the commoner oils to a high temperature, and to pass steam through them, by which means their disagreeable odorous principle was intended to be removed. The distillation of fatty bodies was also claimed by Dubrunfaut, but the chief object of his patent was evidently the purification of

common oils. By decomposing the neutral fatty bodies in this way, acrolein is produced, the vapour of which is so pungent and irritating, both to the eyes and the throat, that no workman can be found to endure it; hence this patent was not successfully worked, yet it contained a germ, which, in the hands of Jones, Wilson, and Gwynne, was elaborated into the art now practised.

In an English patent, dated the 8th December 1842, and granted to William Coley Jones and George Wilson, we find the first application of the combined process of sulphuric saponification and *steam*-distillation. They decompose fats with sulphuric acid, aided by heat, and distil the fat thus decomposed by means of steam, which passes in minute streams out of a perforated coil fixed in the bottom of the still.

This combination of the sulphuric saponification and subsequent distillation solved the fundamental conditions of success; nevertheless a whole series of improvements followed, which essentially contributed to establish the present extension of this system of manufacture.

Patents taken out by Gwynne and Wilson, on the 16th November 1843, and on the 28th December of the same year, secured to them further improvements in this process; in the latter a method is described of reducing the quantity of sulphuric acid employed for decomposing the fats to from 10 lbs. to 6 lbs. for every 112 lbs. of fat, that is to one-sixth, and even to one-tenth of the quantity employed by Frémy in his investigations. This saving was effected by heating the fat to 177° C. (350° F.) Another improvement was the heating of the steam in a series of pipes after it had left the boiler, instead of depending on the temperature of the fat to effect it.

Their last patent on the subject is that of the 30th October 1844, in which they propose to use a jet of super-saturated steam* to heat the fats previous to sulphuric saponification. These patents embody all the plans which, since July 1844, have been in operation at the works of Price's Candle Company at Vauxhall and Battersea, of which Mr. Wilson is the managing director.

Similar manufactories, though not of such magnitude, have been established in other countries; the principal works are those of Masse and Tribouillet at Neuilly, near Paris, Motard in Berlin, Bert at Gijon (Spain), and of the Milly Candle Society in Vienna.

There can be but little doubt, after inspection of the candles in the Exhibition, that the process just described is applicable to the production of the higher class of candle, white, inodorous, and dry to the touch; but this is not the only part which it has filled up to the present time, it is in the treatment of palm-oil and cheap fatty bodies that it renders most valuable service. By its aid, fats the most fetid and impure furnish candles of the finest quality; and thus it utilizes the waste of the glue-maker, and oily residues derived from the waste lyes of woollen and other manufactories.

We now proceed to describe the practical processes of the workshop, the various stages of which will be followed without difficulty after what has been said in the article on soap, and in the foregoing sketch respecting the constitution of fats and their decomposition.

* Steam heated to a higher temperature, after it has left the boiler, than it can acquire if kept in contact with the water from which it is generated at any given pressure.

(c.)—*Description of the Lime Process as practised at Messrs. Ogleby & Co.'s Works at Lambeth.*

Saponification.—Into a large wooden vat, containing a coil of steam-pipes, pierced with small holes, ten tons of tallow are placed, with a quantity of water. The steam, when turned on, issues through the holes into the water, raises its temperature, and melts the tallow; as soon as the water has entered into brisk ebullition, a quantity of lime, in the state of thin cream, is added, and the ebullition continued for six hours, or until complete saponification is effected. From 10 to 15 parts of dry quick-lime are added for every 100 parts of tallow. The lime decomposes the tallow and combines with the resulting stearic, margaric and oleic acids, forming a lime-soap (rock soap), and sets the oxide of glyceryl at liberty in its hydrated state as glycerin which dissolves in the water. The whole is allowed to cool in the vessel in which the boiling is effected, and the solution of glycerin run off.*

The rock-soap, when cold, is reduced to a coarse powder by a mill, consisting of a pair of fluted rollers, over which an axis is placed, carrying tiger-like claws, which revolve between a series of horizontal prongs. The claws, by passing between the prongs, tear the large lumps into small pieces, which are then crushed by the fluted rollers.

Decomposition of the Lime-soap by Acid.—The ground lime-soap is now placed in lead-lined vats, supplied with a perforated copper steam-coil, each vat being capable of holding from eight to ten tons. When the temperature has reached the boiling-point, sulphuric acid, previously diluted, is added in the proportion of about 25 parts to every 100 parts of tallow employed. The sulphuric acid combines with the lime, forming an insoluble sulphate of lime, and liberates the oily acids which float at the top, and are then termed "yellow matter." This yellow matter is run off by cocks, placed at the proper level, into large spouted vessels, called "jacks," and poured from these into flat tin-moulds, in which it is allowed to cool and crystallize.

The sulphate of lime, after being well washed with boiling acidulated water to remove the adhering fat, is sold as manure.

Pressing the Fatty Acids to remove the Oleic Acid.—The cakes of yellow matter are interleaved with cocoa-nut mats (without being sliced and enclosed in bags, as was formerly the case), and subjected between iron-plates to a pressure of 600 tons in a vertical hydraulic press. A great portion of the oleic acid is thus removed, and the mixture of stearic and margaric acids rendered much whiter.

Refining.—The cold-pressed acids are then melted by steam in a lead-lined wooden vat, with a little dilute sulphuric acid, to remove any oxide of iron, or other impurity; poured into flat tin trays, and again allowed to cool and crystallize.

Hot-pressing.—The cakes of stearic acid, when cold, are put separately into a linen-bag, interleaved with cocoa-nut matting and iron plates, previously heated by steam, placed in the trough of a horizontal hydraulic press, which is likewise

* Until within the last four years the glycerin was a valueless product; its utilization is due to Mr. Thomas De La Rue, who, being engaged in experiments on its application in the arts, happened to observe its property of alleviating any irritation of the skin, and suggested to a medical friend its use in the treatment of cutaneous affections.

heated by steam, and then subjected to great pressure for some time. By this operation the remainder of the oleic acid, holding a little of the solid acid in solution, is removed. The pressed cakes retain a small quantity of oleic acid at the edges; these are scraped off, melted, and again pressed.

Second Refining.—This process is simply a repetition of the first process of refining.

Moulding.—In the manufacture of the best description of stearic candles, the moulding is generally performed by hand. The moulds are of pewter, several being fixed in a wooden frame; these moulds are heated to a temperature approaching the fusing-point of the stearic acid, and are rapidly wicked, in the manner already described in speaking of tallow mould candles.

The wicks are all previously prepared by immersion in a solution of boracic acid, or the ammonia-salts of this and other acids, the preparation varying with the experience of different manufacturers. This preparation, called flux, serves to fuse the ashes of the wick into minute globules, which are frequently seen on the extremity of the wick, and which are readily dispersed, and also prevents the formation of earthy and alkaline soaps.

The melted material having been allowed to congeal to a great extent, is run into the moulds. After cooling, the candles shrink sufficiently to be removed with a few light taps on the frame.

The fusing-points of stearic candles are remarkably uniform, though manufactured by various makers in different countries; for example, those taken from Messrs. Ogleby's case congealed at $55^{\circ}\text{--}25^{\circ}\text{C. (131}^{\circ}\text{--}5^{\circ}\text{F.)}$, and one from Do Milly's at $55^{\circ}\text{--}50^{\circ}\text{C. (132}^{\circ}\text{F.)}$ This coincidence is very remarkable. Stearic acid fuses at $70^{\circ}\text{C. (158}^{\circ}\text{F.)}$; margaric acid at $60^{\circ}\text{C. (140}^{\circ}\text{F.)}$ So that from the mixture of the two a compound is formed which fuses at a lower degree than either of the components, for it is almost impossible to assume that the solid acid should still contain a sufficient quantity of oleic acid to reduce its fusing-point to such an extent.

(d.)—Description of the Sulphuric Saponification and Distillation Process employed at the Works of Price's Patent Candle Company.

Sulphuric Saponification.—About 20 tons of fat, say palm oil, are placed in a large lead-lined vat, and fused by a steam-jet. The fluid mass, after being allowed to settle, has now to be exposed to the combined action of concentrated sulphuric acid and heat, and for this purpose is pumped up into the acidifying vessel, in which its temperature is raised to $177^{\circ}\text{C. (350}^{\circ}\text{F.)}$ The means of heating is a jet of low-pressure-steam, which, in its course from the boiler, passes through a series of iron pipes heated in a furnace. The quantity of acid used is in the proportion of 6 lbs. for 112 lbs. of palm-oil. In this operation the palm-oil is decomposed and becomes much blackened. Withdrawn at that period it is seen that an important change has been effected by the action of the acid, as the mass now readily crystallizes to a tolerably solid fat. The fat is now drawn off from the acid and transferred to the washing tank, where it is boiled up with water by means of a steam jet.

Distillation.—After one or two washings the blackened fat is withdrawn and

pumped up to the supply tank, which commands the stills. The stills, which are made of copper, are heated by an open grate; each still is capable of holding five tons of fat. When charged, the temperature is raised to $293^{\circ}\cdot5$ C. (560° F.), and low-pressure-steam passed through the mass; this steam is previously heated by passing through a system of iron pipes placed in a furnace.

The current of steam carries with it the vapour of the fatty acids, and thus facilitates the process. The mixed vapours of fatty acids and water pass together to a series of vertical pipes, which retain a temperature above 100° C. (212° F.), where the fats only condense while the steam passes to a second refrigerator, cooled by a current of water; here it is condensed along with the minute quantity of fat carried over by it. A separating tank, from which the water escapes at the bottom, whilst the fats float on the top, serves to recover this small quantity.

Distillation of the Residue.—After continuing the distillation for a certain period, the residue in the still is transferred to another still formed of iron pipes, set in a furnace, and there submitted to a much higher temperature, and a jet of steam more strongly heated. The residue left in these iron stills is a sort of pitch, and is applied to the same uses as ordinary pitch; by this means an additional quantity of fatty acids is obtained.

The fatty acids, as they run from the still, are used, to a great extent, for the manufacture of candles without pressing, and form what are called Composite candles, which possess all the advantages of being self-snuffing, but are more fusible and softer than the pressed stearic acid candles.

A large proportion of the distilled fats, however, is pressed to make a better sort of candle, and for this purpose 50 hydraulic presses are employed.

Cold Pressing.—The fats are spread by ingenious machinery on woven mats, and submitted to powerful cold pressure, between iron-plates; the oleic, or metoleic acid, runs out, and is collected, and chiefly exported to Germany, where it is employed in soap-making.

Hot Pressing.—After cold-pressing, the fat acids are subjected to hot pressure, in hydraulic presses, confined in a chamber heated by steam. The pressed cakes, after the removal of the edges, are melted in contact with a little diluted sulphuric acid, and run into blocks. When the Reporters visited the works, the Company were distilling at the rate of 130 tons of palm-oil per week.

Moulding.—The moulding of the cheaper descriptions of candles is effected by ingenious machinery invented by Mr. Morgan, of Manchester, and improved by the engineer of the Company. By this machine 18 candles are moulded at one time; the wicks, 60 yards long, are wound on 18 separate reels, one for each mould. As one set of candles is pushed out by a series of plungers, they draw with them into the moulds the wicks for the next lot; these wicks being held temporarily with one clip, whilst the candles are held with another, are cut off close to the candles by a traversing circular cutter. Compound forceps, having 18 holders, now seize the wicks at the open end of the moulds, and hold them in their places; the plungers then return and draw the wick tight. The moulds, which during the operation have remained in a horizontal position, are now turned in a vertical direction, the small end downwards, and are then passed on a railway, to the person who is to fill them, they being

heated to the proper temperature by their transit through a hot closet. They are then passed to other parallel railways and left to cool: after remaining a sufficient time to allow of the solidification of the candles, the moulds are brought back in succession by means of turn-tables to their first position. The forceps (which during the moulding have remained *in situ*) are now removed, and the frame of moulds again turned in a horizontal position. Eighteen plungers or pistons are made to press forward the loose bottoms of the moulds which correspond to the small end of the candle. In pushing these forward the candles are pressed out, and thus the cycle of operations is completed. It must be added that the return-stroke of the piston brings back the bottoms of the moulds against shoulders provided to keep them from falling out.

Pressed cocoa-nut-oil is largely employed to mix with the pressed acids of palm-oil to make the best composite candles.

Price's Candle Company is the most colossal establishment in the world in this branch of chemical manufacture: possessed of five distinct manufactories, besides plantations of cocoa-nut trees in Ceylon, of a capital but little short of half a million sterling, and employing, notwithstanding the best arrangements for economising labour, 800 workpeople, it is not surprising that they divide annually in profits a sum equal to the gross returns of some of the largest continental works (between 40,000*l.* and 50,000*l.*).

The fusing-point of Price's Candle Company's candles of pressed distilled fats obtained by distilling palm-oil is $51^{\circ}\cdot3$ C. (124° F.); those prepared from the pressed fats obtained by distilling Chinese tallow (derived from the *Stillingia sebifera*), according to a patent taken out on the 20th of December 1845, by Wilson, Gwynne, and Wilson, fuse at $57^{\circ}\cdot7$ C. (136° F.).

AUSTRIA.

In the Austrian Department there are Four Exhibitors of stearic candles, whose productions are generally of the highest character: the two principal are, firstly, the APOLLO COMPANY, which is the largest establishment in that country; having two manufactories, and employing about 600 workmen. These works produce about 1,000 tons of stearic candles, and 1,500 tons of soap, annually. The stearic candles of this Company are the whitest in the Austrian Section. Secondly, the MILLY CANDLE SOCIETY, which was established in 1837, with the aid of M. de Milly, who instructed his brother in the art, and sent him to Vienna for that purpose. They have two manufactories, giving work to 200 people; they also employ machinery for moulding. In the one they produce, by the lime-process, 300 tons of candles and 450 tons of soap annually; in the other, they employ the distillation-process, and produce, by distilling palm oil, 300 tons of candles; in all, 600 tons of candles annually.

According to Mr. Buschek, the total annual value of the stearic manufactures in Austria is between 5,000,000 and 6,000,000 florins ($428,572*l.*$ to $514,286*l.*$); this includes the soap made as a secondary product from the oleic acid. Tallow costs 29*s.* per English cwt., and is reckoned to produce 45 per cent. of stearic acid, and 45 per cent. of oleic acid. Stearic acid sells at 66*s.* 3*d.* per cwt., and the manufactured candles at 112*s.* per cwt., which is an extraordinary advance on

the price of the acid. Oleic acid sells at 18s. per cwt., and oleic acid-soda-soap at 25s. per cwt.

BELGIUM.

The manufacture of stearic candles was introduced into this country by De Milly, in 1833, and has since attained a high state of excellence.

The manufactory of C. and J. QUANONNE (who exhibit) was established with his aid; and they have adopted his name, of *Bougies de l'Etoile*, for their candles. They have six hydraulic presses, and produce annually about 240 tons of stearic candles, 70 tons of which are exported.

There are Two other Exhibitors of candles from Belgium, viz. :—DELSTANCHE and LEROY, who employ 17 workmen, and produce 80 tons of stearic candles, 30 tons of which are exported; and CHARLES VAN CAMPENHOUDT and Co., whose manufactory was only established in April 1850; they, nevertheless, have sent the finest specimens. At present they are producing at the rate of about 90 tons per annum.

The wholesale price of stearic candles is from 10d. to 1s. per lb.

CANADA.

The stearic candle manufacture has extended to Canada, which contributes the productions of a single manufactory: from what has been sent, it is fair to anticipate that this art will soon be perfected.

DENMARK.

There is only one Exhibitor of stearic candles in the Danish Department; his productions are very high in price (1s. 4½d. per lb.), a natural consequence of the high protective duty of 27s. 6d. per cwt. on candles imported. At present, Mr. HOLMBLAD'S works are on a very small scale, producing only 20 tons of candles per annum. There are, however, two other manufactories established near Copenhagen.

FRANCE.

As the stearic manufacture was originated in this country, it was to be expected that there would be many Exhibitors representing this art, and that their productions would be of the finest quality, an anticipation which is confirmed by the result, for there are Six Exhibitors of stearic candles by the lime process, and one of stearic candles by the sulphuric process, most of whom have been rewarded. There is likewise One Exhibitor of ornamented candles, which are, however, unimportant. M. de Milly, who was the first to apply the lime-process successfully, established his manufactory of stearic candles in Paris in 1831, and gave the name of *Bougies de l'Etoile* to his products, because it was situated near the *Barrière* bearing that name; his manufactory now produces, on the average, 2 tons of candles per day. Since that period many other makers have sprung up in France; and there are now in Paris and its environs six makers, besides De Milly, who collectively produce, at the least, 10 tons per

day by the lime-process; besides which there are in the French provinces, Seventeen other manufacturers, who make collectively about 17 tons per day. These figures must only be taken as approximations; but they show, that in France alone, at least 7,400 tons of stearic candles are produced by the lime-saponification process. Besides these, MASSE and TRIBOUILLET, who employ the processes of sulphuric saponification and distillation, are mounted to distil about four tons of fat per day. They have exhibited a series of most interesting products, which are described in the list of Awards.

According to a statement furnished by MASSE and TRIBOUILLET, the wholesale prices of their various stearic manufactures are as follow:—The best stearic candles, 11d. per lb.; second quality, 10d.; third quality, 9d.; candles made from unpressed distilled fat acids (composite candles) 7½d., 8½d., and 9d. per lb. according to quality; grease recovered from waste suds, 2d. per lb.; oleic acid, 3½d. per lb.; oleic acid-soda-soap, 3½d. per lb.; and, lastly, paraffin-candles, 1s. 8d. per lb.; but it does not appear that they have yet been supplied in the way of trade.

Candles exported from France in 1850:—

	lbs.	valued at	£
Tallow-candles - -	1,133,590	"	28,792
Stearic-candles - -	1,777,086	"	84,000
Wax-candles (yellow) -	3,925	"	256
" " (bleached)	113,227	"	10,334
Spermaceti-candles -	10,418	"	1,096
All kinds - -	<u>3,038,246</u>	"	<u>124,478</u>

HOLLAND.

Mr. BRANDON, who has sent very beautiful productions, established his works in 1839; he employs two steam-engines, five hydraulic presses, and about 100 workpeople.

INDIA

Excellent stearic candles are sent from Cossypore. *Ceylon* has contributed specimens of cocon-unt stearin and olein.

PRUSSIA.

M. MOTARD was selected as the only Exhibitor to represent Germany, in stearic manufactures; and his articles fully justify the choice of the local authorities. M. Motard exhibits candles made by distillation as well as by lime-saponification.

The wholesale price of stearic candles in Berlin is 1s. 0½d. per pound avoirdupois, of stearic acid, 10½d. per lb.; of candles made from the unpressed distilled acids of palm oil (composite candles), 8d. per lb.; and of the unpressed acids, 7d. per lb.

In 1846 there were Sixty-nine manufactories of soap, candles, and oils, giving employment to Three hundred and fifty-five artizans; also Five establishments for wax-bleaching and wax-candle making, employing Thirty-two workmen.

RUSSIA.

There are Five Exhibitors of stearic candles in the Russian Department, whose productions are most creditable.

Russia possessed, in 1842, Sixty-two candle-manufactories, which produced annually goods valued at 142,800*l.*; and Two hundred and sixty-six tallow-melting establishments, which yielded tallow valued at 1,578,000*l.*

The price of stearic candles in Russia, varies from 10*d.* to 10½*d.* per English pound.

SARDINIA.

There is One Exhibitor of stearic candles from Sardinia.

SPAIN.

In 1839, while the effects of the civil war which paralysed Spain for some years, were still severely felt, M. JULIAN BERT, aided by M. de Milly, had the courage to establish a manufactory of stearic candles in Spain. The difficulties of inducing capitalists to join in forming a Company being overcome, M. Bert had still to contend with formidable obstacles, from the discontinuance, at that time in Spain, of several collateral branches of industry. He was obliged to erect leaden chambers, and manufacture his sulphuric acid; also, to establish a cooper-
age, and a boiler-making shop. In spite of these obstacles, his efforts were so successful, that, since that period his Company have established still more extended works at Gijon, where saponification and distillation are both practised, as well as soap-making, on a very large scale. The distillation furnishes 3,500 lbs. of vegetable fatty acids per day. One hundred and fifteen workpeople are employed in the two establishments; they are all Spaniards, and were instructed at the works. There are Two other manufactories of stearic candles, one at Barcelona, the other at Hernani. The wholesale prices of tallow and palm stearic candles are both 1*s.* 3*d.* per pound avoirdupois.

SWEDEN AND NORWAY.

Some of the finest stearic manufactures in the Exhibition are sent by J. JOHANSSON, of Stockholm. The beauty of these productions arises chiefly from the employment of newly-invented machinery, which this Exhibitor obtained from J. and C. G. Bolinder, Engineers in the same town. Several candle-moulds are exhibited which are remarkable for their internal polish. They are made by simply dipping a cold highly-polished steel-rod into a melted alloy, chiefly composed of tin. In this way two workmen can produce from 100 to 110 moulds per hour. M. Johansson employs a steam-engine of twelve-horse power to work the hydraulic presses, slicing and mixing machines, and also a polishing machine, to which the great lustre of his candles is partly due.

TURKEY.

Moldavia contributed some very good specimens of stearic candles from its only manufactory, which possesses a steam-boiler and two hydraulic presses; and produces about Twenty tons of candles per annum.

UNITED KINGDOM.

In 1832 a manufactory of stearic candles was established in London, with the co-operation of M. de Milly; and in 1833, M. Burjot introduced them into the market under the name of moulded wax.

In 1834, W. S. HALE commenced working, and has from this period gradually extended his works, until he has become one of the largest makers of stearic acid and candles in England, by the lime-process. His aim being the manufacture of a commercial article in large quantities, the productions which he contributes have not the whiteness and high degree of finish of those of some other Exhibitors.

It was likewise in 1834 that C. OGLEBY and Co. commenced working. They have since devoted themselves almost exclusively to the highest articles, and their stearic acid and candles are the whitest in the World's Show.

Soon afterwards J. C. and J. FIELD commenced the manufacture, and have likewise directed their attention successfully to the best class productions.

The manufactory of M. Burjot is no longer in existence, but has supplied the foremen employed in the first instance in the works of the three English exhibitors.

The wholesale price of stearic candles in England is 10*d.* per lb.; and that of stearic acid 9*d.* per lb.

Besides those just named, PRICE'S CANDLE COMPANY exhibit interesting products obtained from the distillation of fats; and Mr. Bauwens, the fat acids recovered from waste lyes.

The wholesale price of palm-stearic candles is 9*d.* per lb., and that of composite candles 5½*d.* per lb.

Imports of palm-oil into the United Kingdom in 1850 :—

					Cwts.
West Coast of Africa	-	-	-	-	434,179
Other Parts	-	-	-	-	13,617
Total	-	-	-	-	<u>447,796</u>

In 1850, 4,672 lbs. of stearic candles were imported into the United Kingdom, and paid 2*H.* duty. This quantity is very insignificant compared with the annual consumption, and arises in a great measure from the cheapness of production in England: another cause, however, is the preference shown by the British public for candles coloured yellow to resemble wax, which description is not manufactured in other countries. It is much to be regretted that this tendency to imitate one material by another should prevail to the extent it does, as it undoubtedly frequently retards the development of each in its own particular sphere. Many instances might be cited in illustration; the imitation of a carpet or marble pavement by oil-cloth, and chintz and silk by paper-hangings immediately occur; to which we may add, as more immediately connected with the subject under discussions, gas-burners made to imitate oil lamps and candles, as if a tube conveying gas could not be arranged in an ornamental form. But to lower the beautiful white of the pure stearic candle by any contamination appears absurd, after bestowing so much skill upon obtaining it free from colour. Our French neighbours who, in matters of taste, are at least our equals, have long since discarded the

less luminous wax-candle, and invariably use those of pure white stearic acid for their grand fêtes. The Jurors lately witnessed a brilliant illustration of this fact in the gorgeous illumination of the Hotel de Ville at Paris.

WURTEMBERG.

Although the name of one manufacturer is given in the *Illustrated Catalogue*, no stearic candles are exhibited in the Wurtemberg Department.

We now come to the consideration of candles made from wax and spermaceti; these substances, though differing from fats properly so called, present some analogy with them; they are even more closely allied than the fats themselves to the class of bodies called compound-ethers, inasmuch as they are actually combinations of certain fatty acids with the oxides of various alcohol-radicals; for, whilst oxide of glyceryl is common to all the fats and oils before spoken of, the waxes and spermaceti have their own peculiar bases, which, when liberated, are (unlike glycerin) insoluble in water; moreover, waxes are only partially acted upon by weak solutions of alkalies, and spermaceti not at all under ordinary circumstances; and although they may be split up into their proximate components by fusion with the solid hydrated alkalies, or ebullition with their very concentrated solutions, they must be considered as non-saponifiable in the ordinary acceptation of the term. The individual differences of wax and spermaceti will be farther elucidated as we proceed.

(c.)—Wax-Candles.

Under the name of wax are included substances of various origin and of very different composition.* The wax employed in the manufacture of candles is secreted by the honey bee, which has the power of producing this substance from its food (sugar). At one time it was thought that the bee collected the wax ready formed from plants, until Liebig advanced the contrary opinion, which was subsequently corroborated by the experiments of MM. Dumas and Milne Edwards.

A wax known as Chinese wax, and resembling spermaceti in appearance, was formerly supposed to be a vegetable wax; but the researches of Sir George Staunton and M. Stanislaus Julien, have demonstrated that it is the secretion of a male insect, the *Coccus ceriferus*, which deposits it on the trees on which it feeds, particularly the *Rhus succedaneum*.† We owe to Mr. Brodie, a knowledge of the true chemical composition of wax. This chemist, by his recent elaborate researches, has shown that Chinese wax is a compound of a peculiar fatty acid (cerotic), and the oxide of an alcohol-radical (cerotyl), and is consequently cerotate oxide of cerotyl. Ordinary bees'-wax he finds generally to contain 22 per cent.

* The attention of the reader is directed to the following specimens of wax obtained from different sources, and which are but little known. Two examples (273 and 293) of bees'-wax from Tasmania, in the section of *Van Diemen's Land*; berry-wax and bees'-wax from *South Africa*; vegetable wax from *St. Domingo*; and in the *Chinese* section a so-called vegetable wax produced in Szechuen, and also white and yellow bees'-wax.

† For much valuable information respecting the so-called vegetable waxes of China, as well as the other products of that vast empire, the reader is referred to the *Étude Pratique du Commerce d'Exportation de la Chine*, by our colleague, M. Natalis Rondot. Paris, 1849. Guillaumin.

of free cerotic acid, which is soluble in alcohol, and, with potassa, forms readily a soap. The residue, which is nearly insoluble in alcohol, and which has been usually called myricin, he has shown to be a compound of palmitic acid, and the oxide of another alcohol—radical (melissyl), that is, palmitate of oxide of melissyl. He has likewise been able to prepare from wax two new solid hydrocarbons (compounds of carbon and hydrogen), similar to paraffin.

Paraffin would be much too costly to be converted into candles if made from wax, as its preparation entails a considerable loss of material; it is, nevertheless, desirable that it should be obtained cheaply from some source, as it is much better adapted than any other substance for illuminating purposes, from its containing no element besides carbon and hydrogen, which are united in equal equivalents; it is, therefore, exactly of the same composition in a hundred parts as olefiant gas, which gives to ordinary coal- and oil-gases their illuminating power. Examples of paraffin-candles are exhibited by MASSE and TRIBOUILLET in the French Section, which were made from paraffin obtained by distilling bituminous schist; but far more interesting specimens are sent by JAMES YOUNG, Class II., No. 7B, which seem to realize the great problem which the rare sagacity of Liebig* pointed out as far back as ten years ago. "It would certainly be esteemed one of the greatest discoveries of the age," says he, "if any one could succeed in condensing coal-gas into a white, dry, solid, odourless substance, portable, and capable of being placed upon a candlestick or burned in a lamp." Now this very problem Mr. Young appears to have accomplished by distilling coal at a comparatively low temperature, whereby he obtains, instead of gas—the product of intense heat—a mixture of liquid and solid substances, the former capable of being burned in lamps like sperm-oil, or of being used for lubricating machinery, the latter yielding a beautiful mould candle as solid and white as any prepared from paraffin of other sources. The Reporters have not, as yet, been able to obtain a fuller account of the economical bearings of Mr. Young's process,† which will most likely be considered in the Report upon another Class, but they confidently hope that this truly beautiful discovery will not meet with similar difficulties as the plan proposed some years ago for making paraffin-candles out of Irish peat. If coal-paraffin can actually be obtained in sufficient quantity and at moderate cost, we may witness another revolution in the processes of illumination; and the brilliant discoveries of Chevreul, but lately threatened by the splendour of the electric light, may be eclipsed by the general adoption of solidified coal-gas candles.

In most countries, wax intended to be made into candles is previously bleached by a process presently to be described. That this, however, is not always the case, we find by specimens exhibited in the Egyptian and Tunisian Courts. The candles in the latter, which we may infer resemble those of the classical ancients, are true yellow wax "dips," and have a very ungainly appearance. The bees'-wax from which they are made is principally produced in the province of Kirwan; and the primitive method usually adopted for their manufacture consists in merely melting the wax in a copper vessel, and then dipping the wick repeatedly into it.

* *Familiar Letters on Chemistry*, 3rd edition; Letter XII., p. 158.

† According to a statement furnished to the Reporters, 100 parts of cannel-coal, from Bathgate, yielded 40 parts of oil and 10 parts of paraffin.

Although such is the usual mode, the wax is sometimes bleached, and of course finer candles produced, but none such were exhibited. No animal fat is employed in Tunis for the manufacture of candles, although stearic candles of European manufacture are imported, and are in very general use.

Wax is more valuable when bleached, not only on account of the greater beauty, but also from the removal by this operation of impurities which would clog the wick during combustion. It may be bleached by chlorine, but the process is of no value, because its constituents retain a portion in combination, and hence hydrochloric acid is given off in burning.*

The method of bleaching employed is very simple, although tedious: the following, with some trifling variations, is the plan adopted in most countries.

Wax Bleaching.—The wax is cut up into small pieces and placed in a vat, into which steam is made to pass through a perforated coil of pipes: a small quantity of very dilute sulphuric acid being added in the proportion of one pint measure of strong sulphuric acid (oil of vitriol), to one ton of wax, and the whole well agitated for some time. This addition of sulphuric acid facilitates the separation of impurities which subside into the acidulated water.

As soon as, by subsidence, the wax has become bright, it is removed into a trough, with holes in the bottom about the size of an ordinary quill. The melted wax runs through these holes in small streams, on to a wooden cylinder, which is made to revolve, and the lower half of which is immersed in a cistern of cold water. The motion of the cylinder carries up a layer of water, on which the streams of wax fall, and form exceedingly thin ribbons, varying from half to one inch in breadth; these ribbons, by the revolution of the cylinder, dip under water, and as they rise upon the opposite surface, are removed, and spread out thinly and evenly on tables placed in the open air, so as to be exposed to the action of the sun and air for a period varying from five to ten weeks. Once or twice, during that period, the wax is again subjected to the same process of melting; it requires also frequent turning so as to present every portion to the bleaching agency of sunlight.

The fusing-point of wax is raised by bleaching, for yellow wax fuses between 62° and 63° C. (144° and 146° F.), and bleached wax between 64° and 65° C. (147° and 149° F.).

All waxes are not found to bleach with equal facility, according to the statement of Mr. Barclay. For example, English, Hamburgh, Odessa, Portuguese, Mogadore, Zanzibar, East and West Indian, and North American waxes bleach very readily, whilst those from Cuba, Dantzic, Königsberg, Gambia, and Gabon are only bleached with difficulty, and seldom acquire a good colour.

Notwithstanding the difficulty with which Gambia wax is bleached, and its liability to become of a rusty brown, that country furnishes the greater part of the wax which is imported into Great Britain. Large quantities are likewise

* The attempt to bleach wax by means of chlorine, although unsuccessful in a practical point of view, has been very fertile in theoretical results. It is not generally known that one of the leading views in chemistry, the so-called theory of substitution, derived its origin from Gay-Lussac's observation, that wax, when exposed to the action of chlorine, absorbed this element into its composition, releasing an equivalent quantity of hydrogen in the form of hydrochloric acid.

imported from Mogadore, the East Indies, particularly Ceylon and Singapore, and North America; the Mogadore wax is frequently largely adulterated with fat.

From Brazil a curious wax has been imported, the product of a black bee, which hives underground. It is soft, and exceedingly tenacious, and of a dark mahogany colour. It does not appear in the slightest degree bleached after exposure to the sun. A considerable quantity might be imported, but no use has as yet been found for it.

The English wax is the most esteemed of all, but the small quantity produced is absorbed for various purposes without bleaching, on account of its fine quality and its brightness and fragrantcy.

In 1850 the quantity of bees'-wax imported for home consumption in Great Britain was 10,761 cwt., besides a small quantity of vegetable wax amounting to only 5 cwt. There is no duty on wax.

1,067 lbs. of wax candles were also imported and paid 9*l.* duty.

Wax is not well adapted for moulding on account of its tendency to adhere to the mould, and its great contraction in cooling; and though these difficulties may be overcome, yet it is found more advantageous to make wax-candles in the manner about to be described, as they are found to burn much better.

The first process consists in warming the wicks in a stove, and then suspending them to a hoop placed over a vessel of melted wax. The workman pours the melted wax with a ladle on to each wick in succession, and at the same time causes the wick to revolve on its axis by the motion of the fingers; when the candles are about one-third made, they are allowed to cool for a time, and the operation of pouring repeated until the candles are about half made, which is ascertained by the eye or by weighing. Whilst still warm, they are removed from the hooks and subjected to a process of rolling between two marble slabs, so as to render them uniform in thickness. The upper end of each candle is now formed by cutting down the wax to a metal tag which covered one end of the wick. The candles are then again suspended to the hoops, the end which had previously hung downwards being now upwards; and the operations of basting and rolling repeated as often as necessary. Lastly, the lower ends of the candles are cut off to make them of equal length.

The wicks of wax-candles are always made of twisted unbleached Turkey cotton, the fibre of which appears better to resist the temperature of the highly heated wax during combustion. Plaited wicks are not adapted for wax-candles, as the plaiting, by diminishing the capillary action, entails the employment of so large a wick that it obscures the light; beside which, it is apt to curl round and round in the flame, and to collect a quantity of soot.

The large wax-candles, used in churches, are formed by laying the wick on to a slab of wax, which is then folded over on the wick, and the candle finished by rolling.

Long wax-tapers are made by winding the wick on a drum, and then leading it under a guide-roller, placed in a trough of melted wax; from this it passes through a series of bores, progressively smaller, on to a second drum; the operation resembling somewhat that of wire-drawing. A little turpentine is added so as to render the wax pliable enough to wind.

Wax candles are coloured with the following materials:—

Blue	- - -	Artificial ultramarine.
Green	- - -	Mixture of verdigris and emerald green, or verdigris only.
Yellow	- - -	Chrome-yellow.
Red	- - -	Vermilion.
Pink	- - -	Madder-lake.

Wax mortar-lights which are used as night-lights, have wicks of flax, as cotton is not found to be so well adapted to resist the long-continued action of the high temperature, and is not so uniform in its capillary action.

The larger mortar-lights have plaited wicks, and are used principally for warming dishes.

CHINA.

The Chinese employ bees'-wax, the insect-wax before spoken of, and also vegetable tallow (obtained from the *Stillingia sebifera*, a tree of the order *Euphorbiaceæ*), in the manufacture of candles. The insect-wax is purified by filtration through moist rice, and is then, for the purpose of candle-making, mixed with one-hundredth part of oil. Bees'-wax is used either alone, or to form thin shells, into which the vegetable tallow is poured. This plan of encasing a soft with a hard material has been long in use in China, though only of recent introduction in Europe. The only contribution in the Chinese Department is from the Honourable EAST INDIA COMPANY, who exhibit some examples of wax-tapers from Peking.

EGYPT.

From Egypt are contributed a few specimens of wax-candles, some of unbleached and others of bleached wax, which must be characterised as crude manufactures.

INDIA.

The Indian Department contains some well-made short candles of bleached-wax, six and nine inches in length, which are manufactured at Patna. They are designated camphorated wax.

RUSSIA.

The most important contribution of that country is V. SAPELKIN'S (309), which consists chiefly of wax-lights, plain and ornamented, for the use of churches, though there are several for household use. Most of the other collections are small, and consist in some cases only of wax-twisted tapers. Two Exhibitors have sent fancy-baskets made of waxed wicks. In 1842 the wax produced in Russia was valued at 59,200*l*.

TUNIS.

This department contributes the most ungainly candles in the Exhibition.

TURKEY.

The Turkish Department contains specimens of very well made and well-bleached wax-candles, and twisted tapers. The Jury have included these in their

Award to HIS HIGHNESS the SULTAN, as in common with most of the articles exhibited, they were bought in the bazaars, and no individual Exhibitor's name was given.

UNITED KINGDOM.

The most remarkable collection of wax-candles, and specimens to illustrate wax-bleaching, is that of BARCLAY and SON, wax-bleachers, who exhibit in the South-west Gallery. The manufactures are of the highest quality as regards the uniformity of the candle, and especially the very careful attention bestowed on the wick, the value of which was only to be ascertained by burning. The night-lights have the excellent quality of burning the indicated number of hours, which is a point of some importance.

(f.)—*Ornamented Candles.*

The collection of ornamented wax-candles for weddings and fête days is in fair proportion. FRANCE, PORTUGAL,* RUSSIA, and WURTEMBERG furnish specimens. Some decorated wax-candles for Catholic churches are also contributed by TUCKER and Co. to the Mediæval Court, Class XXVI., No. 534.

The only three objects still to be noticed are candles made of two different descriptions of vegetable wax in its natural state. Those from ST. DOMINGO are of a greenish colour, and probably from the wax of the *Myrica cerifera*. The others from NEW BRUNSWICK are dark green. Lastly, there are black candles made from bituminous shale of the Binney Quarry, Scotland, exhibited in the North Gallery, No. 94.

(g.)—*Spermaceti.*

Spermaceti is a white crystalline body, fusing at 49° C. (120° F.). In its chemical relations it is closely allied to wax, and, according to the experiments of Mr. Laurence Smith, appears to be a compound-ether, namely, cetylate of oxide of cetyl; cetylic acid having the same percentage composition as palmitic acid, derived from palm-oil.

Spermaceti is obtained from the oil of the sperm whale, from which it readily crystallizes, especially in cold weather. The purification of sperm oil depends in a great measure on the complete separation of the spermaceti, hence, sperm-oil "bagged" in winter, from yielding a larger quantity of spermaceti, is less liable afterwards to congeal than that bagged in summer.

DESCRIPTION OF THE PROCESS OF SPERMACETI REFINING AT MESSRS. OGLEBY AND CO.'S WORKS, LAMBETH.

Bagging.—To separate the crystallized spermaceti, the sperm-oil is filtered through long cylinders of bagging, lined with linen, these are at one end tied on to the nozzles of a feed-pipe communicating with a tank elevated about 6 feet, whilst the other end of the cylinder is tied up with a string. The oil being pressed upon

* There is a manufactory of stearic candles in Lisbon, but it has not contributed any of its productions.

by its own column, readily passes through the bags, which retain the spermaceti. This operation is called bagging, and is performed on a very large scale in the autumn and winter.

The spermaceti is of a dingy-brownish colour, and is readily removed from the bags, which are open at both ends; in this state it is called "bagged sperm."

Pressing.—The bagged sperm is then placed in hempen sacks, and subjected to a pressure of about 80 tons in an hydraulic press, which removes the greater portion of the adhering oil.

Second Pressing.—The pressed sperm is now melted, and crystallized by slow cooling, and after being ground to powder, is folded up in square pieces of bagging, and then subjected to the action of a much larger hydraulic press, capable of exerting a force of six hundred tons. The oil which runs from this press contains a small quantity of spermaceti, and is, therefore, returned to the bags to be filtered.

Refining.—The spermaceti is next melted in a large iron vessel, and boiled for some time with a solution of caustic soda, which readily saponifies the sperm-oil still adhering to the spermaceti, whilst it has scarcely any action on the spermaceti itself. By this means the sperm-oil is removed in the form of soap.

Hot-pressing.—The purified spermaceti is removed from the boiler, and run into flat tin-moulds to crystallize. It is then ground again to powder, and placed in linen bags, interleaved with horse-hair mats, and previously heated iron-plates, and pressed in a horizontal hydraulic hot-press, heated by steam.

Second Refining.—The hot-pressed spermaceti is then removed and boiled with a strong alkaline lye, the temperature reaching 113° C. (235° F.) By this final operation it becomes as colourless as water, and has only to be cast into blocks for the convenience of storing.

The wholesale price of spermaceti at present is 1s. 10d. per pound in England.

Spermaceti-candles are moulded in the usual manner, about 3 per cent. of wax being added to prevent crystallization. Spermaceti-candles are often coloured yellow with gamboge, and are then known by the name of transparent wax.

The wick of the spermaceti-candle is of plaited bleached cotton, and requires no previous preparation.

UNITED KINGDOM.

There are remarkably fine specimens of spermaceti and spermaceti-candles in the English Department, contributed by four Exhibitors.

There are also specimens from the UNITED STATES, and NEW SOUTH WALES, of a less important character.

It will be seen, from the subjoined account of Imports into the United Kingdom, that very little spermaceti is brought in as such, and that the major part is obtained by refining sperm-oil.

Imports during the Year 1850.

			Tons	5,792	Duty.
Sperm-oil	-	-			Free.
Spermaceti	-	-	lbs.	1,120	"
Spermaceti-candles	-	-	"	728	2d.

There are Sixty-four Exhibitors of candles of all nations, of these there are :—

1	Holder of a Council Medal.
20	Holders of a Prize Medal.
10	Who obtained Honourable Mention.
33	Unrewarded.
—	
64	

The number of Exhibitors from the various countries is as follows :—

America - - - - -	1	Brought forward - - -	45
Austria - - - - -	6	Prussia - - - - -	2
Belgium - - - - -	3	Russia - - - - -	8
British Colonies - - - - -	8	Sardinia - - - - -	2
China - - - - -	1	Spain - - - - -	1
Denmark - - - - -	1	Sweden and Norway - - -	1
Egypt - - - - -	1	St. Domingo - - - - -	1
France - - - - -	8	Tunis - - - - -	1
Great Britain and Ireland - - -	14	Turkey - - - - -	2
Holland - - - - -	1	Wurtemberg - - - - -	1
Portugal - - - - -	1		
	—		—
Carried forward - - - - -	45		64

The Sixty-four Exhibitors of candles admit of classification according to the description of candles they chiefly exhibit, for only two have contributed in more than one of the classes into which they may be subdivided. Thus, there are Seven tallow-candle makers, Twenty-one wax-candle-makers and wax-bleachers ; Four spermaceti-refiners or spermaceti-candle-makers, and Thirty-two stearic acid and stearic-candle manufacturers. Nine of the latter exhibit soap, but only as a secondary product of their stearic manufacture ; it has not, therefore, been taken into consideration under the head of soap and perfumery.

Before specifying the contributions of each Exhibitor who has received the award either of a Council Medal, Prize Medal, or Honourable Mention, a few words may be said to illustrate the point of view from which their merits have been judged. From our introductory remarks respecting the different varieties of candles, it is evident that tallow, stearic acid, composite, wax, and spermaceti candles cannot be judged by the same standard, as the various products serve different purposes, and on account of the difference in their cost can scarcely be said to compete one with the other. The physicist may determine their relative illuminating power by experiment, and can, by comparing the price of similar quantities of different materials, ascertain the relative illuminating value of each variety. If carefully executed, such experiments may yield very positive results as to the purely economic question of the money-cost of a given quantity of light, but are of no avail in estimating the advantages offered by the different articles in point of cleanliness, purity, or presentability ; how, for example, can the relative purity of stearic acid, wax, or spermaceti be estimated ? how can the blue white of stearic acid, the brightness of wax, the transparency of spermaceti be measured by such means ; and how the convenience of the self-snuffing candle ?

If photometric experiments on the different illuminating powers of flames are to be of any value, they must be instituted with extreme care and accuracy.

Hitherto the results obtained by different physicists have been marked by great discrepancies; this is to be explained by the difficulties which present themselves in the method of determination at present pursued. We need scarcely remark that we have not instituted experiments of this kind for the purpose of comparing the different varieties of candles exhibited. The amount of material submitted to the Jurors was so extensive, as to compel them to confine themselves to judging of the quality of the productions by their external appearance, and the manner in which they burned. On account of the great difference in the fiscal relations of the countries contributing, and the great variation in the price of the raw material, it was not even possible to take into consideration the question of price which was given in some instances.

A little practice, however, soon enabled the Jurors to separate the different articles into the three classes of Excellent, Good, and Mediocre. The characters by which these were fixed were—colour, density, and fusing-point of the candles, brilliancy, and steadiness of the flame, continuous consumption of the wick, and less or greater tendency to gutter in a current of air.

LIST OF AWARDS.

APOLLO STEARIN COMPANY, Vienna (Austria, No. 39). Prize Medal, for an interesting display of stearic acid in blocks, and stearic candles; this is one of the largest, while at the same time, it is one of the best in the Exhibition. The great excellence of these candles manufactured by the process of lime-saponification, their hardness and whiteness are evidences of a thorough knowledge of this chemico-mechanical art, and of a minute attention to all the details of the various processes, without which no such articles could be produced.

BARCLAY and SON, Regent Street, London (Class IV. No. 24). Prize Medal. A very large collection, illustrative of the processes of wax-bleaching and wax-candle making. Also wax night-lights, and wax mortar-lights for warming dishes on the dinner-table. The Medal is awarded to these Exhibitors, chiefly on account of the excellence of the above-named products; but as they exhibit likewise, remarkably good Stearic and Spermaceti candles, these latter are included in the Award.

BAUWENS, L. F., Grease-Works, Wakefield (Class IV., No. 26). Prize Medal. The Award to this Exhibitor is for the recovery of fatty acids, applicable to soap-making and to the manufacture of candles, from the waste lyes and suds of the woollen, silk, and cotton manufactories. The quantity of soap used by the various branches of manufactures in favour of which the soap-duty is remitted, amounted in the year 1850 to 22,858,382 lbs., which may be estimated as containing, on the average, about 50 per cent. of fats, or 11,429,191 lbs., or in round numbers 5,000 tons. The importance, therefore, of economising this otherwise waste product, will be fully appreciated if it be taken into consideration, that the manufacture of wool entails moreover the employment of a large quantity of oil, which is afterwards removed by washing. The quantity of oil employed for this purpose in Great Britain, may be estimated at about 6,000 tons,* contained in the suds in

* In the year 1850, 378,022 bales of foreign wool, each containing, on the average, 250 lbs., were imported into London, Liverpool, Hull, and Leith; so that about 31,000 tons were im-

addition to the fat contained in the soap, making together about 11,000 tons. But supposing that from unavoidable sources of waste only 5,000 tons were annually recoverable, and estimating it to produce 15*l.* per ton, the value would still amount to 75,000*l.*

BERT, J. J. and Co., Madrid and Gijon (Spain, Nos. 245 and 246). Prize Medal. The Jury award to M. Bert a Prize Medal for products of the highest class from the two manufactories he has established in Spain. From that of Madrid, in which saponification by lime only is practised, he sends beautiful Stearic acid and Stearic candles; from that of Gijon, in which he has lately erected a distilling apparatus to include the most recent improvements of England and France, he sends Palmitic acid equal to any in the Exhibition, together with candles made of it. These latter candles are allowed by the Catholic clergy of Spain to be used in the churches.

BRANDON, N. D., Amsterdam (Holland, No. 70). Prize Medal. The Candles exhibited by Mr. Brandon are a proof that, in Holland, the stearic manufacture has reached its highest state of perfection; his candles are all that can be desired in hardness and careful moulding. The long Stearic candles, which in Holland are allowed by the clergy to be used in churches, are very beautiful specimens of manufacture. The interest in the collection of this Exhibitor is enhanced by the intermediate products which he has sent to illustrate the various stages of the process.

BRIEN, C., Dublin (Class XXIX., No. 90). Honourable Mention. Mr. Brien exhibits very well manufactured tallow Mould-candles, which are white and hard.

CAMPENHOUDT, CHARLES VAN, and Co., Heusden, Flanders (Belgium, No. 436). Prize Medal. The productions of these makers, whilst they are the finest in the Belgian Division, may vie with most in the Exhibition for whiteness and hardness. Their candles named "*Bougies de l'Étoile*," are beautifully moulded, and have a high degree of polish.

DELACRETAZ and FOURCADE, Vaugirard, near Paris (France, No. 158). Honourable Mention. Messrs. Delacretaz and Co. are extensive contributors to the Exhibition, having sent some very large blocks of Stearic acid, which is hard, but not of the highest degree of whiteness; the Jury, therefore, though they cannot award a Prize Medal to them, accord an Honourable Mention for their productions, which are very good, and which it appears they manufacture on a very extensive scale.

DIXON, GEORGE, Dublin (Class XXIX., No. 91). Honourable Mention. The Jury make Honourable Mention of the clarified tallow Mould-candles of great whiteness, hardness, and exterior polish, made of a mixture of purified tallow and stearic acid; also of the composite candles, and the Yellow-soap exhibited by Mr. Dixon, which is likewise well manufactured.

DONNEAUD and Co., Paris (France, No. 478). Honourable Mention. The Jury accord an Honourable Mention to Messrs. Donneaud and Company, for their Stearic acid, and Stearic candles, called "*Bougies du Phare*;" though not possess-

ported in that year; and as about 20 lbs. of oil are consumed in "working" or scrubbing every 112 lbs. of wool, there must have been upwards of 5,500 tons used for the *foreign* wool only.

ing that whiteness for which the Stearic acid of many Exhibitors is remarkable, still their products are very creditable, the candles being well moulded.

DUMORTIER and Co., Lyons (France, No. 1593). Prize Medal, for most excellent white and hard Stearic candles, well polished, and carefully moulded.

FIELD, J. C. and J., Wigmore Street (Class IV., No. 130). Prize Medal, for the very fine blocks of white and hard Stearic acid, which they exhibit, and which evince a thorough knowledge of the stearic manufacture.

FREEMAN, E., Wigmore Street (Class IV., No. 25). Prize Medal, for very excellent spermaceti candles, called "transparent wax." The spermaceti candle (containing a small quantity of wax, to prevent crystallization), is in many cases preferred to wax, on account of its greater transparency, and brilliancy of flame. The peculiar tint of the wax is imitated in these candles by the addition of gamboge.

HALE, W. S., Queen Street (Class XXIX., No. 99.) Honourable Mention. The productions which Mr. Hale exhibits, though very creditable, are not of the highest class, and seem more especially confined to the cheaper description of Stearic candle, and those very economical, though not so presentable, sources of light, the so-called "Composite candles," which possess the property of being self-snuffing, and are much cheaper than the cheapest stearic candle, though from their low fusing-point they are not so well adapted for use in hot climates.

HOLMBLAD, L. P., Copenhagen (Denmark, No. 27). Honourable Mention, for a small collection of Stearic candles, exhibited in connection with other articles by M. Holmblad. They are white and hard, but extremely high in price.

JAILLON, MOINIER, and Co., La Villette, near Paris (France, No. 273). Prize Medal. The stearic acid manufactured by these Exhibitors is made according to a recently-patented plan, which consists in passing a rapid current of sulphurous acid into the lime-vat, during the process of saponification, by which they state that they are able to produce a much greater quantity of solid fats than if they operated without the introduction of sulphurous acid*; besides which, that they are enabled to use the commonest tallow, and produce white inodorous candles. The Jury could not enter into an experimental investigation of the merits of this new plan, and, therefore, wish it to be understood that the novelty, or the supposed or real advantage of the process did not in the least influence the award of the Prize Medal, which is given solely on the merits of the products exhibited. The Stearic acid and candles are, without doubt, amongst the best in the Exhibition, whilst they are the whitest in the French Department made by the process of lime-saponification.

JOHANSSON, J., Stockholm (Sweden and Norway, No. 17). Prize Medal. The stearic acid contributed by this Exhibitor is eminently pure, white, and hard, and is, with one single exception, the whitest in the Exhibition. It is most creditable to M. Johansson to have stood the test of comparison with so many veterans in the art, and to have come off with such high honours. The candles exhibited are most beautifully polished, more highly so than any others, and in other respects well moulded; the polish is due to a peculiar mould, which is exhibited, and which is produced by a peculiar method already described in the introductory notice (p. 1383).

* The chemist cannot help thinking of the conversion of the liquid oleic acid into the solid elaidic acid.

MASSE, TRIBOUILLET and Co., Neuilly (France, 1346). Prize Medal. Messrs. Masse, Tribouillet, and Co., are amongst the largest Exhibitors in this Department, having contributed no less than thirty-five samples, illustrative of several very important branches of art connected with the manufacture of candles. Seven samples relate to that important industry in an economical point of view, the recovery of fats from waste suds and other refuse matter; as, for example, the parings of skin, and animal intestines. The candles manufactured from the distilled and pressed fats are very beautiful, hard, and white. There are seven also which show the progress of the manufacture of Palmitic candles by the process of distillation, and include candles made with the unpressed fat acids, likewise very hard and white pressed Palmitic acid candles, also candles made with a thin shell of hard Palmitic acid, the centre being filled with the unpressed fatty acids.* Three are the products of the recovery of fats from the waste suds of the wool-washers, and are similar to the first named. Four relate to the manufacture of candles from vegetable wax. There are also three specimens of the products of distillation from bituminous schist, including Paraffin-candles; and candles covered with lithographic transfers, which it appears are used in France, but they have a very common appearance. Besides these, there are specimens of oleic acid, olein, from pressed tallow, and oleic acid-soda soap. The Jury award the Prize Medal to Messrs. Masse and Tribouillet for their very beautiful candles, manufactured from various fatty acids produced by the process of distillation, and their extensive and interesting collection of products relating thereto.

MATISEN, A., and Co., St. Petersburg (Russia, No. 305). Prize Medal, for very beautiful Stearic acid, of which MM. Matisen have sent seven blocks, and Stearic caudles, of excellent manufacture. These productions have a great degree of hardness, and are very carefully moulded.

MILLER, T. J., Dorset Wharf, Westminster (Class IV., No. 29). Prize Medal. An interesting collection in the South-West Gallery, showing the progress of Spermaceti-refining, also an enormous and beautifully crystallized hollow block, or grotto of Spermaceti, in the Western Nave. The Jury award the Prize Medal to this manufacturer on account of the very high degree of excellence to which he has brought the process of spermaceti-refining, as evinced by the absence of colour and impurity in the large mass he has exhibited, to produce which, no less a quantity than 3 tons, or 6,720 lbs. were fused at one time. After being allowed to remain at rest for a week, the spermaceti had cooled sufficiently round the circumference of the cask to be tapped, when about one-half was run out; so that the shell which is exhibited, at 1s. 10d. per lb., is worth 308l.

MILLY, LOUIS ADOLPHE DE, Paris (France, No. 644). Council Medal. M. de Milly exhibits stearic candles, called by him "*Bougies de l'Etoile*," a name which, with that of Milly (stearin), is applied all over Europe to similar products. He has sent, likewise, Lime-soap, the mixture of fat acids resulting from the decomposition of this soap, pressed Stearic acid, and Oleic acid, so as to illustrate the various steps in the process; and besides these, oleic acid, potash or soft, and soda or hard-soaps, made with the oleic acid. In consideration of M. de Milly being the first to solve the manufacturing problem of applying M. Chevreul's beautiful

* See page 1389 — China.

theoretical discoveries to the production of candles, the application of boracic acid for the preparation of candle-wicks, and the aid he has always rendered in establishing this chemical art in other countries, the Jury recommended M. de Milly to the Council of Chairmen as worthy of the Medal in their gift.

MILLY STEARIN-CANDLE COMPANY, Vienna (Austria, No. 40). Prize Medal. For a very splendid display of the stearic acid manufacture, both by the process of distillation and the older one of lime-saponification. This Society have, in compliment to the Exhibition, sent three large and well-executed stearic acid Medallions; one of the Emperor of Austria, one of Her Majesty Queen Victoria, and one of Prince Albert. Their candles made by the process of lime-saponification are very hard, white and well moulded, and their night-lights or *veillieuses*, carefully manufactured. They have also exhibited the so-called "Composite" candles made with the unpressed products of the distillation of palm-oil.

MOTARD, A., Berlin (Prussia, No. 262). Prize Medal. Very excellent Stearic candles manufactured by the process of lime-saponification, exhibited in connection with the Stearo-margaric acid of which they are made; also, Stearic candles made of the unpressed and pressed fatty acids derived from Palm-oil, by the process of distillation. The stearic candles from the hot-pressed fatty acids of palm-oil are very beautiful; those made with the acids as they run from the still are an excellent and cheap substitute for the tallow-candle. The collection is well arranged, and illustrates both processes very satisfactorily.

OGLEBY, CHARLES, and Co., Lambeth (Class XXIX., No. 139). Prize Medal. The Stearic candles contributed by this Firm are the whitest in the Exhibition, and were used by the Jury as a standard of excellence, with which the productions of other Exhibitors were compared. The so-called "Transparent wax" candles made with a mixture of stearic acid and wax are very beautiful, and burn with a remarkably dry cup. The Spermaceti in block, also exhibited, is of the greatest whiteness, and most beautifully crystallized. The Spermaceti candles, and those made of a mixture of spermaceti and wax, are exceedingly well manufactured. The Prize Medal is awarded by the Jury for the Spermaceti and Stearic manufactures, either of which would have entitled these Exhibitors to the Award.

PITANSIER, Odessa (Russia, No. 307). Prize Medal. The piece of hot-pressed Stearic acid exhibited by M. Pitansier, is prepared from mutton-tallow; it is extremely hard and sonorous, and beautifully white; the Stearic candles are the whitest and best in the Russian Section, and occupy a first rank in the Exhibition.

POISSAT (Uncle) and Co. (France, No. 1399). Honourable Mention. The Jury make Honourable Mention of a few small pieces of Stearic acid, exhibited with other articles, by MM. Poissat and Co.; and which, from their diminutive size, had almost escaped observation. The Stearic acid was very white and hard.

PRICE'S PATENT CANDLE COMPANY, Belmont Works, Vauxhall (Class IV., No. 83). Prize Medal, for the invention of improved methods of distilling fatty bodies, illustrated by the following articles: very beautiful white and hard Candles manufactured from the distilled and pressed stearic acid of Palm-oil; candles equally hard and white, made from distilled animal fatty acids recovered from the Refuse of the Glue-maker, and which possess an additional interest in being

obtained from a waste product; and candles made from the distilled Vegetable tallow obtained from the *Stillingia sebifera*. Besides these, they exhibit the unpressed distilled fatty acids of Palm-oil, in the state in which they are largely employed for the manufacture of the so-called composite candles, which appear to be destined to supersede the ordinary tallow-candle. See the Prefatory Notice respecting the recommendation for the award of the *Council Medal* (p. 1335).

QUANONNE, C. and J., Cureghem, Brabant (Belgium, No. 431). Prize Medal. The manufactory of these Exhibitors, which was the first established in Belgium, is one of the offshoots of that of De Milly, in Paris; hence, they adopt the name for their candles which was given to stearic candles by their instructor, namely "*Bougies de l'Étoile*." As regards colour and hardness, their stearic acid leaves nothing to desire; but their candles are not quite so carefully moulded as they might be; and have not that high degree of polish which is expected in candles of first class manufacture in other respects.

ROSSI and SCHIAPPARELLI, Turin (Sardinia, No. 6). Honourable Mention. Though the Jury did not find the stearic manufactures of these Exhibitors quite equal to the best examples, they consider the stearic acid and candles to be carefully made, and therefore accord them an Honourable Mention.

SAINTE and Co., Cossypore (India, Class XXIX.). Honourable Mention. The Jury have much satisfaction in making an Honourable Mention of the very good stearic candles manufactured in India by Messrs. Sainte and Co. The local manufacture of Stearic candles deserves every encouragement, as they are peculiarly suitable to hot climates, on account of their high fusing-point, and as there must be a large quantity of fats of little value, which would answer well for their production.

SAPELKIN, V., Moscow (Russia, No. 309). Honourable Mention. The Jury accord to Mr. Sapelkin an Honourable Mention in consideration of the great care bestowed on the manufacture of Wax-candles for church-service; many of these are tastefully ornamented with a simple spiral of gold, and have a very elegant appearance. The equality in size of the candles, as compared with one another, and likewise of their diameter throughout their whole length, are points deserving commendation. It appears that in the Greek Catholic Churches only wax or vegetable oil is allowed to be burned.

III.—PROTEAN STONE, OR ARTIFICIAL IVORY.

Under this title there are exhibited, in Class XXIX., a number of articles, such as door-handles, finger-plates, inkstands, and letter-weights. These very beautiful objects are composed of a new material, derived from gypsum (native bi-hydrated sulphate of lime), which, by numerous variations in the method of treating it, is made to resemble ivory, granite, and various kinds of marble. From the specimens exhibited it appears to be very hard, and capable of taking the highest polish, which, it is said, is perpetuated by use. It is translucent and brilliant in colour, and, being tinted throughout the mass, the marbling and mottling are not liable to be rubbed off. It appears to be applicable to many purposes for which ivory and marble are at present used; but it is not fitted to be made into knife-handles on account of its brittleness.

In order to illustrate this very ingenious manufacture, we must recal to the recollection of the reader the very familiar phenomenon of the solidification of a mixture of plaster-of-Paris (de-hydrated sulphate of lime) and water, which arises from the circumstance that the *anhydrous* sulphate of lime re-combines with water equivalent in quantity to that of which gypsum is deprived by heat in the formation of plaster. But, as under the conditions of this solidification the plaster is diluted with far more water than it can re-combine with, it results that a portion must be left in a free state in the interstices of the mass, which is consequently opaque, and, on drying, becomes porous; and although it is the same in chemical composition, it differs greatly in its physical aspect and properties from the native compound gypsum or alabaster, which is crystalline and translucent.

In reflecting on the cause of this difference, it occurred to Mr. Cheverton that if the combination of water and anhydrous sulphate of lime could be slowly effected, whilst the latter was in a state of compression, an artificial stone might be produced, compact and crystalline in texture, and translucent in appearance. This view was fully confirmed by a series of experiments.

The process by which these results are obtained is described in the specification of Mr. Cheverton's patent, obtained in June 1850, as consisting in the de-hydration and subsequent re-hydration of native bi-hydrated sulphate of lime, either in a compact form, as alabaster, or in the state of a fine powder. In the first instance the alabaster is wrought into the required form; and in the second the material, in the state of a very fine powder, is compressed into a mould of the proper shape.

In either case, after the object has been fashioned, it is exposed for 48 hours to a temperature of from 121° to 177° C. (250° to 350° F.), by which means the water originally combined with the sulphate of lime is driven off. The substance thus becomes very friable, but still retains the form into which it has been wrought. Sometimes plaster-of-Paris itself is compressed into moulds, but the article so formed is still subjected to the operation just described, notwithstanding the previous baking of the gypsum.

If a translucent appearance is required to be given to the surface of the figure, it is, before re-hydration, immersed into "white hard varnish," olive-oil, or other "oleaginous matter," until the surface is saturated; but if an opaque surface is desired, then this operation is omitted.

To effect the hardening, the object is plunged for an *instant only* into water heated to a temperature of from 38° to $65\frac{1}{2}^{\circ}$ C. (100° to 150° F.). This operation is repeated at intervals of from 10 to 15 minutes, until the sulphate of lime is completely saturated. The mass then becomes crystalline and much harder than alabaster; a circumstance which induces a belief that the new substance contains a quantity of water in combination different from that in the native body; or, in other words, that it is a new hydrate of sulphate of lime. The success of this part of the process depends in a great measure on the very gradual manner in which the combination with water is managed; for without due care the material decrepitates, and the article is then destroyed.

The colouring is effected by dissolving the requisite colours in water, and either sprinkling the object here and there with the coloured solution so as to produce a mottled appearance, or else by immersing it altogether in the dye, which produces

an uniform stain. This operation is performed previous to that of dipping in oil or varnish.

To the only Exhibitors of this branch of manufacture,

D. STAGHT and SONS (Class XXIX., No. 252), a Prize Medal is awarded.

IV.—BLACKING.

Although the compound which we now call Blacking (French, *Cirage*) is in all probability of very recent invention, nevertheless it appears to have been customary to imbue shoes with an oily mixture before the time of Pliny, since it is stated by him, that Cato recommended the dregs of the olive (after the expression of the oil), to be used for anointing bridle-reins, leather-thongs, and shoes, in order to render them supple.* It must, however, be remarked that a mixture somewhat similar to modern blacking is also described by the same author,† and it appears quite natural to infer the occasional use of it for renovating the black colour which we are also informed was given by shoemakers to leather, by means of vitriol:‡ two kinds of substances of this name being known, namely, blue-vitriol (sulphate of copper) and green-vitriol (copperas, or sulphate of iron).

The mixture alluded to was chiefly used for ink, whence it was commonly called *atramentum*. It was composed of lamp-black, gum, and vinegar, and would, therefore, only have required the addition of oil and honey to make it into a tolerable blacking. This inference is rendered the more probable from the discovery of the remains of leather found in the Roman gravel-pit, discovered in digging the foundation for the New Royal Exchange, which appears to have been covered with a sort of blacking. They are thus described by Mr. Tite, the Architect.§ “The fragments, in general, are of black leather, similar to that of the other articles; but there are some pieces which may possibly have been once of another colour. It is most probable that the upper surface was almost always shining, and several instances may be noticed where it still retains a dull gloss, which appears usually to have protected that particular side.”

The French word “*Cirage*,” however, renders it extremely probable that modern blacking was originally composed chiefly of wax and tallow, and probably lamp-black; and somewhat similar, therefore, to harness-blacking. That ordinary liquid-blacking was first imported into France from England, is probable, from the circumstance that blacking was termed *Cirage Anglais*, at all events to the year 1830, and it may still be known by that name.

When or how the English mixture now employed was first discovered, the Reporters cannot pretend to decide; but, according to the statement of Mr. William C. Day (nephew of Mr. Charles Day), the recipe for its preparation was communicated to Mr. Richard Martin whilst he was travelling on the Continent. Mr. Martin afterwards became associated with the late Mr. Charles Day; and in 1801 they commenced the manufacture of blacking. Mr. Martin having retired in 1808, the business was still carried on under the names of Day and Martin, by Mr. Day, until his death, in 1836, by which period he had acquired a colossal fortune.

* *Nat. Hist.*, Book xv., chap. viii.

† *Nat. Hist.*, Book xxxv., chap. i.

‡ *Ibid.*, Book xxxiv., chap. xii.

§ *Antiquities of the Royal Exchange*, 1818, p. 56.

To give some idea of the extent of the operations still carried on at "Day and Martin's," it may be stated, that on the average 150 casks, containing a quantity of blacking equal to 900 dozen pint bottles, are sent out per day. The price of the stone-ware bottles, for containing the blacking, varies with their size, the usual sizes costing 6s., 9s., and 12s. per gross; and the corks (bungs) costing 1s. 4d. per gross. There is also a large outlay required for labels and sealing-wax.

Besides the establishment of Messrs. Day and Martin, there are, in London, two other very important blacking-manufactories. One of these was founded by Mr. Robert Warren, who commenced about the same time as the firm already noticed, and retired some years back; but the business is still carried on by his successors; and the other was founded, at a subsequent period, by Mr. Everett, who commenced business in King's Head Court, Holborn, and afterwards transferred his manufactory to Fetter-lane, where it still exists; Mr. Everett died in 1840, not, however, before he had realised a considerable fortune. Only the last-named of these large blacking-works contributes to the Exhibition, and unfortunately its manufactures were not brought under the notice of the Jury.

Blacking, it may be remarked, consists essentially of two principal components, namely, a black colouring-matter and certain substances which will acquire a gloss by friction. Each maker has, of course, proportions and methods of mixing peculiar to himself, but the chief materials used are the same in most cases. In England* they generally consist of:—Bone-black, sugar or molasses, sperm-oil, sulphuric acid (oil of vitriol), and strong vinegar. These, according to Mr. W. C. Day, are mixed in the following order:—The bone-black, in the state of a very fine powder, and the sperm-oil are first thoroughly incorporated; the sugar or molasses, mixed with a small proportion of vinegar, is now added and well-stirred with the mass; strong sulphuric acid (oil of vitriol) is then gradually poured into the vessel. Much heat is generated at this stage of the process, and an effervescence ensues, owing to the action of the acid on the carbonate of lime contained in the bone-black. The object of the sulphuric acid (which should not be in excess), is to cause the decomposition of the tri-basic phosphate (and the carbonate) of lime, contained in the bone-black, so as to produce on the one hand sulphate of lime, and on the other a soluble acid phosphate. Sulphate of lime, when produced under such circumstances, gives rise to a very tenacious paste, by mixing with the finely divided carbonaceous matter of bone-black disintegrated by the same reaction; which paste (or lake) is capable, when spread out, assuming a very smooth surface. To this the sugar and the oil impart the property, not only of adhering to the leather, but also of taking a high degree of lustre under the frictional (or burnishing) action of the brush; the oil is moreover very useful in rendering the leather pliable.

The mixture, after the action of the acid has ceased, is diluted with an additional quantity of vinegar, and is bottled whilst it is still warm. By bottling the liquid in this state, and corking and sealing it immediately, a rarefied space is formed; and

* According to the information which Baron Liebig has kindly furnished to the Reporters, it appears that, in Germany, blacking is made in the following manner: powdered bone-black is mixed with half its weight of molasses, and one-eighth of its weight of olive-oil; to which are afterwards added one-eighth of its weight of hydrochloric acid (muriatic acid), and one-fourth of its weight of strong sulphuric acid. The whole is then mixed up with water to a sort of unctuous paste.

there is no liability afterwards that the blacking (if it wet the cork) will exude by the expansion of the air contained in the bottle, as it is not likely to become again heated to the same temperature under the influence of any climate to which it may be subjected. The vinegar employed should not be too weak, otherwise the blacking will not keep.

Paste-blacking is now made in precisely the same way as Liquid-blacking, excepting that the last portion of vinegar is not added. The employment of such blacking appears to have preceded that of liquid-blacking. It was usually stuck on to a small shovel-shaped board, having a very short handle; and it was wetted with water (or saliva) as required. The old Cake-blacking differed in composition from that of the present day, and appears to have contained lamp-black, treacle, and oil.

AMERICA.

Two Exhibitors send both Liquid and Paste-blacking, the former being contained in glass bottles, and not stone-ware as in England. The blacking was found to be nearly of the same quality from both; but not so good as that commonly used in England. The contributors are E. STEERE, No. 290, W. R. BAKER, No. 401. T. TURNER, No. 425, sends Edge-blacking for shoemakers.

BRITISH COLONIES.

C. WARD contributes a specimen of blacking, but it calls for no especial notice.

FRANCE.

In 1847 there were, in Paris, One hundred and thirty-seven manufacturers of blacking and varnish for shoes, who employed 140 workpeople, and produced goods to the value of 38,800*l.*; France is, however, represented by only One Exhibitor in this trade, M. HÉBERT, who sends a specimen of varnish for boots and shoes, which was not submitted to the Jury of Class XXIX.

PRUSSIA.

The only contribution is from C. TEICHMANN; it consists of Paste blacking, which, though of fair quality, is not equal to the English blacking.

SARDINIA.

B. BOURGOIN exhibits specimens of Paste-blacking for shoes, and paste Harness-blacking, which call for no particular comment.

UNITED KINGDOM.

The contributions of two Exhibitors only were brought under the notice of the Jury of Class XXIX., namely, Nos. 272 and 281: of these, the best is that of S. B. ALCOCK and Co., of Dublin (No. 272), whose productions are here favourably noticed, although no Award was made. The wholesale prices of their usual size bottles of liquid-blacking are 3*s.*, 6*s.*, and 9*s.* per dozen.

The manufactures of the other Exhibitors who contribute to Classes II., No. 22; IV., No. 70; XVI., Nos. 39 and 322—were not observed by the Reporters until the duties of the Jury were completed.

The number of Exhibitors from all parts is Thirteen. There were no Awards.

The classification according to the various countries is as follows :—

America, United States of	-	-	-	3
British Colonies :—Van Diemen's Land	-	-	-	1
France	-	-	-	1
Prussia	-	-	-	1
Sardinia	-	-	-	1
United Kingdom	-	-	-	6
Total	-	-	-	13

V.—CHEMICAL MATCHES.

The manufacturers of chemical matches are placed in an anomalous position with regard to the other contributors in the Great Exhibition, inasmuch as that they were not permitted to send their *actual produce*, on account of the precautions deemed advisable to be taken for the security of the Exhibition Building against fire. Hence they were compelled to rest satisfied with contributing unflammable imitations of their articles; and under such circumstances it is evident that it was quite impossible for the Jury to make any equitable Awards in this branch of industry. This result is the more to be regretted as the manufacture of chemical matches, although comparatively a very recent art, has been of late years developed in a most remarkable manner; and notwithstanding the high degree of perfection to which it has already attained, it is still undergoing further improvements consequent on the rapid progress of chemical science. Had it been possible to have foreseen and provided against all contingencies, an out-building might have been constructed for the reception of these goods, which would have afforded a secure as well as a most valuable opportunity of comparing the relative merits of the matches prepared in various countries.

In another part of this Report will be found some descriptive notices of several conveniences for travellers and others contained in the hollow heads of walking-sticks. One of these consisted of an apparatus for procuring instantaneous light, and the contrivance appears almost to realize the fable of Prometheus, who concealed the fire which he stole from Jupiter in his *narthex*, ferula, or stem of fennel, on which he leaned in travelling.

"I am he who sought the source of Fire,
Enclosing it hid in my narthex-staff;
And it hath shown itself a friend to man,
And Teacher of all Arts." *

This invention, however, was in reality only the means of preserving fire unextinguished, somewhat like the German tinder of the present time, and not of causing

* *Æsch., Prometheus Vinct.*, 110.

instantaneous ignition. The giant-fennel, of which the ordinary ancient walking-sticks were made, sheds its seeds about September, when the stem decays, and becomes a substance so easily ignited as to be employed in Sicily for tinder. The pith of the plant also is stated by Proclus to be an excellent preserver of flame; to which Pliny adds his testimony, that it makes excellent matches, the Egyptian sort being the best.*

There is, however, another form in which a staff may be metaphorically said to conceal fire, since one of the most primitive means of producing it was by the friction of two pieces of wood against each other until sparks were emitted, and flame was then easily communicated to dry leaves or decayed vegetable matter. This method of procuring fire has been found generally in use in several savage nations, though with some difference in the process; and St. Pierre describes one of the most common, as practised by the West Indian negroes:—"With the sharp edge of a stone," says his narrative, "Paul made a small hole in the branch of a tree that was sufficiently dry, which he fixed firmly between his feet, and he then employed the stone to shape into a point another piece of wood, equally dry, but of a kind different from the former. He next placed the pointed wood in the hole which he had provided, and made it to turn rapidly between his hands like a chocolate-mill, and in a few moments he saw smoke and sparks issuing from the place of contact, and then collecting dry plants and sticks, he lighted a fire at the foot of the palm-tree."†

It appears that the same process was in ordinary use with the Romans down to even a late period, even when the flint and steel were well known. "This experience," says Pliny, "was first discovered in camps and by shepherds, when a fire was wanted and a fitting stone was not at hand; for they rubbed together wood upon wood, by which attrition sparks were engendered, and then collecting any dry matter of leaves or fungi, they easily took fire. For this purpose nothing is better than to rub the wood of the ivy with that of the laurel, and a wild vine, different from the *labrusca*, which grows upon trees in the manner of ivy, has been also proved to be good."‡ The same authority, in enumerating the different kinds of wood fit for kindling a light, denominates them *igniaria*, or those trees out of which fire may be produced. *Pyxidicula igniaria* appears to have been the usual name of a Roman tinder-box, but Solinus calls the fire-box *Ignitabulum*, and assigns its invention to Pyropolis, in the island of Dolos.§ In those receptacles the apparatus probably consisted as well of a small iron bar and a fragment of flint or pyrites, as of pieces of those woods which were the most readily ignited. Virgil notices "the hidden fire in the veins of flints,"|| as being one of the benefits anciently bestowed on man at the commencement of the reign of Jupiter; and pyrites are described by Pliny as being well known and esteemed for producing sparks. Certain of them, he says, "have much fire in them, whence we call them *living*, and they are very heavy. They are sought for because they are most valuable in camps; for when they are struck hard with an iron spike (*clavus*), or another

* Proclus, *Comment. in Hesiod, Opera et Dies*, i. 52. Plinii *Hist. Nat.*, xiii. 22.

† *Suite des Études de la Nature: Paul et Virginie*.

‡ *Hist. Nat.*, xvi. 40.

§ *Polyhistor*, c. xi.

|| *Georg.*, i. 135.

stone, they will emit sparks, which being taken by sulphur or dry fungus or leaves, will cause them to catch fire even with the rapidity of speech."*

There does not appear to be any information extant relating to the material anciently employed for tinder, unless it may be presumed to be indicated in that passage of the Prophet Isaiah (chap. i., v. 31) which declares that "the strong shall be as tow and the maker of it a spark, and they shall both burn together, and none shall quench them." It is probable that a very small degree of experience would suggest the thought that flax or the linen wicks used for lamps would easily receive sparks and become ignited, but of this there has not been any certain information preserved.

For many centuries the apparatus of a stone struck against a piece of iron continued, with but little improvement, to be the only means of procuring light. By the Saxons the flint or the pyrites was used under the general name of *fyr-stan*; and any piece of iron that was sufficiently substantial was the substitute for the modern steel. A writing-stylus is known to have been used for the purpose by the Abbot Bertin in Burgundy early in the seventh century; an instrument, however, which should be at once more substantial and more convenient for striking, must have been soon required, and was probably as speedily invented in the form of the *fusil*, a thick rhomboidal piece of steel, having the faces cut into many angles. This was in use at a very early period of the Middle Ages, when it is frequently to be found mentioned under a variety of names, all of them being derived from the same original. In 1429 Philip the Good, Duke of Burgundy, established the Order of the Golden Fleece, in the collar of which the flint and steel of the time formed the principal device.† The latter was therein represented as a short and stout fusil, sharpened to a pointed edge on one side, and on the other having two small curved handles, with a vacant space between them for the hand; and a modification of this shape for the steel continued to exist to the close of the history of the old-fashioned tinder-box.

It was not until after the middle of the eighteenth century that the discovery of phosphorus indicated a quicker or more certain means of procuring light or fire. In 1677 Dr. Hook, in one of his Cutler Lectures, described the effects of phosphorus, as they had been recently exhibited in England to the Hon. Robert Boyle and several other Fellows of the Royal Society, by Daniel Krafft, "a famous German chemist." Even after all the earliest experiments, however, the new matter appeared to be regarded only as a curiosity, which Boyle entitled the "*Noctiluca*," and "a fictitious self-shining substance," procured but in very small quantities, and with great labour and time; the principal value of which was to supply a light in the night or in dark places, when exhibited in glass vessels. It can scarcely be doubted but that some trial was made as to whether an ordinary match could be inflamed by the substance, but Boyle's recorded experiments refer only to the strength, the diffusion, and the continuance of the light.

After these notices of the older apparatus devised for procuring light, it will be an interesting inquiry briefly to glance at the history of chemical matches. And here it may be first remarked that the transition from the tinder-box, with its

* *Hist. Nat.*, xxxvi. 19.

† Du Fresnoy, *Gleanerium*, 1736, vi. col. 562, voce Sol, 3.

flint and steel, to the elegant friction-match, was not so simple as a superficial consideration of the subject might lead one to infer. In the daily enjoyment of a luxury, we but too often forget the persevering efforts which are always necessary to render available the discoveries of the experimental philosopher, and take but little heed of him whose disinterested labours are constantly bringing to light new truths from the hidden but inexhaustible stores of nature.

The perfecting of chemical matches has been accomplished chiefly during the last thirty years, for before 1820 scarcely any other method of producing fire was employed than that of the well-known trio before alluded to, with which the ordinary sulphur match was inseparably associated.

Soon after this period, Doebereiner made the remarkable discovery that finely-divided platinum (*spongy platinum*) is capable of inflaming a mixture of hydrogen gas and atmospheric air, and he founded on this property of platinum the invention of the Instantaneous Light Apparatus, first known by the name of Doebereiner's Hydrogen-Lamp. This was greatly admired at that time, and is even now frequently employed, it having been again recently applied to light an ordinary gas burner, required to be ignited at intervals during the day-time for the purpose of sealing parcels and other similar objects. Although it was without any immediate influence on the development of the manufacture of chemical matches, which had before this time been repeatedly attempted, Doebereiner's discovery appears, nevertheless, to have attracted attention more generally to the subject, and thus, at least, to have contributed indirectly to their perfection.

A method of producing ignition, proposed about the same period, has never been generally adopted. It depends upon the property which certain compounds of phosphorus and sulphur possess of inflaming when slightly rubbed, in contact with the atmosphere. For this purpose about equal quantities of phosphorus and sulphur are fused together in a glass tube, which is to be subsequently closed with a cork.* Upon opening the tube, if a splinter of wood be dipped into the mass, so that a small quantity of the composition may adhere to the wood, it will become ignited when slightly rubbed on the cork used to close the phial. This apparatus, however, has become almost entirely obsolete.

The first important and permanent improvement in the means of obtaining light consisted in covering the sulphurized end of a match with a mixture of sugar and chlorate of potash; which being deflagrated by immersion into concentrated sulphuric acid, communicated the inflammation to the underlying coating of sulphur. Many persons will call to mind the small glass phial containing asbestos moistened with concentrated sulphuric acid, which is usually fixed in a paper or tin box having two compartments, one of which held the prepared matches. These matches were in all probability invented in France, whence at least they were certainly first introduced into England; but prior to their introduction Captain Manby had been accustomed to employ a similar mixture for firing a small piece of ordnance for the purpose of conveying a rope to a stranded vessel; and indeed the composition was also described by Parkes in his *Chemical*

* To those who would repeat this experiment, we would remark, that the fusion should be performed with great caution, inasmuch as the mixture frequently detonates at the moment when the components enter into chemical combination.

Catechism,* amongst the experiments illustrative of combustion and detonation at the close of the volume.

Exactly the same principle was involved in the preparation of the matches invented by Mr. Jones of the Strand, and used for some time in England under the name of "Prometheans," but which do not appear to have found their way to the Continent. These were made of a roll of paper, into one end of which was placed a small quantity of a mixture of sugar and chlorate of potash, with a small tube (hermetically sealed), similar to those in which the leads of ever-pointed pencils are preserved, containing a minute quantity of strong sulphuric acid. By compressing the match with a pair of pliers, sold for the purpose, or between two hard substances (between the teeth, for example), the tube was crushed, and the sulphuric acid came into contact with the mixture, and ignited it. These matches, though very convenient, were so expensive that they were not very generally employed; but they certainly formed, as it were, the stepping-stone to the production of the friction-match.

The first true friction-matches, or congraves, made their appearance about the year 1832. They had a coating of a mixture of two parts of sulphide of antimony and one part of chlorate of potash, made into a paste with gum-water, over their sulphurized ends, and were ignited by drawing them rapidly between the two surfaces of a piece of folded sand-paper, which was compressed by the finger and thumb.

The Reporters have not succeeded in learning with certainty by whom the substitution of phosphorus for the sulphide of antimony was first suggested; the mixture of the sulphide with chlorate of potash required so much pressure to produce the ignition that it was frequently pulled off from the match, and this substitution was therefore an important improvement.† The phosphorus-matches or lucifers appear indeed to have been introduced contemporaneously in different countries about the year 1834. In Germany they were first manufactured on a large scale in the Grand Duchy of Hesse, and especially in Darmstadt, where Dr. Moldenhauer, in particular, contributed much to the improvement of this branch of industry.

From Darmstadt the manufacture was gradually extended throughout Germany; but its progress was at first very slow, on account of the lucifer-match being prohibited, until the year 1840, in Bavaria, Brunswick, Hanover, and various other states, on account of the alleged increased risk of fire consequent upon its employment. At present, however, there are manufactories established in Vienna, Prague, Triesch, Schüttenhofen, and Goldenkrön, Berlin, Nuremberg, Ludwigsburg, Ulm, Gmünd, Warnemünde, and numerous other places.

According to Dr. Moldenhauer and Professor Schütter (to whom the Reporters take this opportunity of expressing their thanks for most of the statistical and other information respecting the progress of the art in Germany), there are in the province of Starkenburg, Grand Duchy of Hesse Darmstadt, no less than Eight

* Third Edition, 1808, p. 563.

† Detonating mixtures of chlorate of potash with either sulphide of antimony or phosphorus, are described in Parkes' *Chemical Catechism*, 10th Edit., published in 1822; and the latter in the 3rd Edition (1808).

manufactories, producing weekly about 500,000 boxes of matches, which are valued at 3,000 florins (257*l.*); yet the Grand Duchy is unrepresented in the Great Exhibition as to the production of (artificial) chemical matches.

In Austria, the manufacture of chemical matches has been of late developed to so great an extent, that it supplies not only what is required for home consumption, but also enough to form an important article of exportation; indeed it appears that the most important item of Austrian commerce with Chili consists of matches.

The matches manufactured in Austria amounted in 1849 to 50,000 cwt., of which four-fifths were consumed in the country, and one-fifth was exported. From Trieste 3,787 cwt. were shipped, viz, to

	Cwts.
Turkey - - - - -	1,226
Greece - - - - -	596
Malta - - - - -	402
Egypt - - - - -	382
Ionian Islands - - - - -	336
Naples - - - - -	225
Other Countries - - - - -	530
Total - - - - -	<u>3,787</u>

That the export trade of Austria in matches is rapidly increasing, appears from the following statement of the quantities shipped on the Elbe during the last three years :—

Quantities shipped on the Elbe in	Cwts.
1848 - - - - -	286
1849 - - - - -	790
1850 - - - - -	1,860

As matches are not always specified in the Official Report on Commerce, it is not possible to give a detailed statement of all the quantities exported.

It is estimated that of the total production of matches in Austria, one-third is manufactured in Bohemia and two-thirds in the factories of Vienna and its vicinity. The number of factories in Bohemia is ten; of these there are Two in Prague, One of which exhibits; One at Schüttenhofen, which also exhibits; One at Budweis, One at Toplitz, One at Taus, One at Tschernoschin, One at Schöenthal, One at Nahoschitz, and One at Hohenelbe. These establishments give employment to about 1,000 workpeople.

In Austria Proper there are Twenty-two factories, namely, Sixteen at Vienna, two of which exhibit, Three at Fünfhaus, One at Schirding, One at Tulle, and One at Pottenstein; there is also one in Moravia, which likewise exhibits. The number of workpeople employed is about 2,000.

In illustration of the quantities of the different materials employed, it may be stated that a Bohemian manufactory employing 100 workpeople produces annually about 200,000 boxes, each containing 5,000 matches. It consumes annually 25 cwt. of nitre, 6½ cwt. of phosphorus, and 300 cwt. of sulphur. Calculating on this data, the total amount of materials consumed in all Austria, the following numbers are obtained :—

	Cwts.
Nitre - - - - -	1,250
Phosphorus - - - - -	325
Sulphur - - - - -	15,000

The quantity of soft wood consumed annually amounts to 5,000 *klafters* or fathoms ; and it is worthy of notice that a large portion of it is manufactured into splints in Budweis, and thence sent to Vienna. About 50,000 millions of single matches are produced annually in Austria. These are made with astonishing rapidity, in consequence of the employment of a simple plane of peculiar construction ; with this instrument a single workman cuts off 1,814,000 splints in a day of 12 hours.

From other parts of Germany there are Four Exhibitors : namely, one from Prussia, Two from Wurtemberg, and One from Mecklenburg-Schwerin ; the Reporters, however, have not been able to ascertain how far they represent the manufacture in all those places ; but they are enabled to state that there were Twenty-one manufactories, employing Five Hundred and Sixty-one workpeople, in Prussia in 1846.

According to a statement of M. Payen, the quantity of phosphorus consumed in France for lucifer-matches amounts to 30,000 kilogs. (590 cwt.), whilst 100 kilogs. (2 cwt.) suffice for all the other purposes for which it is used. In 1850*, 220 kilogs. (4½ cwt.) were exported to England. From these numbers it would appear that the quantity of lucifers manufactured in France must exceed that of Austria in the ratio of 590 to 325, or as 18 to 10. Yet France is unrepresented in this art, the only contributor exhibiting sliding-boxes to contain the matches.

The Reporters have not been able to collect any information respecting the extent of this manufacture in the United Kingdom. In 1850 there were 50,000 gross of matches imported into the port of Hull : but the Reporters are unable to state the total number imported into the United Kingdom, as chemical matches are entered in the Customs' returns under the general head of "Goods non-enumerated."

Formerly large quantities of phosphorus were imported into the United Kingdom for the purpose of chemical match-making ; but it will be seen by the following table, that this substance must now be made within the British dominions in sufficient quantity to supply the entire demand.

VALUE of the IMPORTS of PHOSPHORUS into the United Kingdom.

	From 9th July.	From Denmark.	From the Hanseatic Towns.	From Holland.	From France.	From all Parts.	
	£.	£.	£.	£.	£.	£.	
1842†	1	45	14	1,102	1,162		
1843	-	1	20	2,349	2,370		
1844	-	-	83	2,484	2,567		
1845	-	-	25	1,474	1,499		
1846	-	12	-	619	631		
1847	-	22	52	498	572		
1848	-	16	15	149	180		
1849	-	29	60	33	122		
1850	-	2	-	1	3		

Although lucifer-matches are made to some extent in the United States, there is no exhibitor of them in the American section.

* Previous to 1850, phosphorus was comprised among the "*Produits Chimiques*."

† Previous to the 9th of July 1842, the imports of phosphorus were entered under the general head of "Goods non-enumerated."

In continuing the narrative of the progress of this manufacture, we may next observe that, as it extended, all the processes were much simplified, and as a consequence, the prices of the articles produced were lowered. Nor was this the only improvement, for a whole series of inflammable compounds was successively tried; and at last, by substituting, entirely or partially, saltpetre for chlorate of potash, the detonation attendant on the earlier matches was avoided. It was also found that the sulphur-coating of the match could be to a great extent, or even entirely dispensed with, and the cause of the unpleasant odour previously accompanying ignition in a great measure removed. Beside the ordinary match of wood, numerous other materials were devised, which could not have been made with the original composition of sulphide of antimony and chlorate of potash; as, for instance, wax-taper matches, fuses of Amadou (German tinder), and brown paper, Vesuvians for insertion into a segar, &c. The roughly-formed wood-matches, also, which had been previously cut by hand, were superseded by others carefully rounded by machinery.

The match having reached this point of perfection, some attention was given to the embellishment of the boxes by the various manufacturers, who tried to excel each other in the elegance, convenience, and security of the case, for which various materials were employed—for instance, cardboard, wood, and metal—the latter being usually ornamented with coloured lacquers and engine-turning.

With regard to the composition for the matches now in use, Dr. Ure, in the *Supplement* to his *Dictionary of Arts and Manufactures*, p. 153, gives the following recipe of Dr. R. Boettger:—

						Pts.
Phosphorus	-	-	-	-	-	4
Nitre	-	-	-	-	-	10
Fine glue	-	-	-	-	-	6
Red ochre, or red lead	-	-	-	-	-	5
Smalt	-	-	-	-	-	2

The glue is to be converted into a smooth jelly with a little water, and put into a warm mortar to liquefy; the phosphorus is then to be rubbed down with the gelatine, at a temperature of from 60° to 65½° C. (140° to 150° F.), after which the nitre is to be added, then the red powder, and, lastly, the smalt, the whole being carefully mixed until it becomes an uniform paste.

Lucifer wood-matches that inflame without sulphur are prepared, according to Dr. Ure, by the ends being rubbed against a red-hot iron plate, and then dipped for a moment into melted white wax, contained in a shallow flat-bottomed pan.

In March 1842 Mr. Reuben Partridge obtained a patent for forming wooden splints, by pressing, with suitable machinery, a block of wood against a steel plate perforated with holes, placed together as closely as possible. The wood is thus forced through the perforations, being first split, as it advances, by their cutting edges, and comes out on the opposite side of the plate in the form of a multitude of distinct splints. Much attention has also been paid to the improvement of the apparatus for dipping the matches.

Before closing this short sketch of the manufacture of chemical matches, the Reporters wish to draw scientific and public notice to the terrible disease to which it sometimes gives rise. Dr. Lorinser, of Vienna, in 1845, first called the attention

of men of science and the public to the fact, that individuals working in lucifer-match manufactories were subject to pain and swelling of the jaws, followed in many instances by exfoliation of the bone. This was repeatedly confirmed by other observers, and induced several Governments to institute inquiries into the matter. The results of all the investigations made into this interesting question have been collected by Doctors Von Bibra and Geist, in a publication entitled *Die Krankheiten der Arbeiter in Phosphor-Zündholzfabriken*, Erlangen, 1847.

The disease has been observed principally in Germany, but it is also met with elsewhere, and especially in England.* The Reporters had the opportunity of obtaining some information on the subject from Dr. Sieveking, who has examined the disease with much care as it occurs in the London manufactories. According to his observations, the affection assumes the same character as it has done in Germany, and attacks those only who are engaged in dipping the matches into the inflammable compound, and who are therefore more immediately exposed to the phosphorous vapour. Dr. Sieveking saw several of these workmen (dippers) who had lost almost the entire lower jaw. After these painful statements, it is important and consolatory to know that the same physician has not found the disease to be equally prevalent in all manufactories; and that if cleanliness be enforced, and the dietary of the workpeople well attended to, and especially if a complete and continuous ventilation of the workshop be kept up, no evil consequences ensue. Dr. Sieveking met with parties who had been engaged in dipping matches for more than ten years, without exhibiting the slightest tendency to the complaint.

The importance of attending to the precautions indicated by these investigations can scarcely be sufficiently impressed upon the manufacturer. Much has been already done by several firms, especially in regard to ventilation, but much remains to be accomplished if this frightful scourge is to be entirely removed. For this reason manufacturers should direct their attention to an important discovery made by science, in the shape of the so-called red or amorphous phosphorus. Some few years ago Professor Schrötter, of Vienna, observed the curious fact, that if ordinary phosphorus be exposed during a certain period to a temperature of from 250° to 260° C (482° to 500° F.), it is converted into a red modification, which no longer possesses the main characteristics of phosphorus, viz.,—volatility, fusibility, and inflammability at comparatively low temperatures. The poisonous qualities have also entirely disappeared in this modified condition of the substance. The amorphous modification of phosphorus, which but a few years ago was a mere curiosity in chemical laboratories, can now, however, be manufactured according to a method proposed by Schrötter, in large quantities, and is likely to become an important article of commerce. The Chemical Section of the Exhibition (Class II., No. 119) contained a fine specimen of this substance, sent in by J. E. STURGE, of Birmingham. The red phosphorus being perfectly innocuous when handled, and not giving off fumes in the atmosphere, whilst it is as well adapted to the manufacture of matches as the ordinary phosphorus, it is fair to assume that its general adoption by lucifer-match makers will prove a farther guarantee against the disease of the workpeople. It is right also to mention that DIXON, SON, and Co., have exhibited matches made with Schrötter's phosphorus (Class II., 126). These

* *British and Foreign Medico-Chirurgical Review*, vol. i., p. 446, et seq.

manufacturers state that they are as cheaply and as easily made as the common matches, and are not so liable to fire in the making.

The number of Exhibitors of imitation matches and other means of obtaining light is Fourteen. The classification according to the several countries is as follows:—

Austria	-	-	-	-	-	5
France	-	-	-	-	-	1
India	-	-	-	-	-	1
Mecklenburg-Schwerin	-	-	-	-	-	1
Prussia	-	-	-	-	-	1
United Kingdom	-	-	-	-	-	3
Wurtemberg	-	-	-	-	-	2
Total	-	-	-	-	-	<u>14</u>

LIST OF EXHIBITORS.

BELL and BLACK, Bow Lane (Class XXIX., No. 243). Imitation Vestas, Congreves, and Wax-Matches; Camphorated round wood Congreves.

DE MAJO, S., Triesch (Austria, No. 50). Imitation Lucifer-matches in great variety.

DIXON, SON, and Co, Manchester (Class II., No. 126). Matches made with Professor A. Schrötter's Phosphorus.

FURTH, B., Schüttenhofen and Goldenkron (Austria, No. 46). A large display of Imitation Lucifer-matches, in a variety of boxes.

HARRASS, P., Suhl (Prussia, No. 798). Imitation Lucifer-matches.

HOFFMANN, C. and G., Wisoczan, near Prague (Austria, No. 49). Imitation Lucifer-matches.

KUHN, J., Ulm (Wurtemberg, No. 102). A variety of Imitation Lucifer-matches.

LEFRANCOIS, —, Paris (France, No. 301). Sliding-boxes for lucifer-matches, and Taper-stands for lucifer-matches, and amadou, in great variety.

MEYER, W., Warnemünde (Mecklenburg-Schwerin, No. 6). Splints for Lucifer-matches.

POLLAK, A. M., Vienna (Austria, No. 47). Imitation Lucifers of several kinds.

PRESCHEL, F., and Co, Vienna (Austria, No. 48). Various descriptions of Imitation Lucifers.

RAJAH OF JESSELMERE (India, Class XXII.). Several Steels for striking light, which are interesting as connecting the present with the past in the art of obtaining fire.

SANDELL, E., Putney (Class XXIX., No. 97). Odoriferous Lighters, made of embossed card.

SUTORIUS, C. F., Gmünd (Wurtemberg, No. 100). Lucifer-matches without the combustible material.

VI.—CONFECTIONARY.

The articles belonging to this species of preparations submitted to the Jury of Class XXIX. consisted, firstly, of fruits preserved with sugar; and secondly, of

confections, comprising sweetmeats made both from sugar and from chocolate. Of preserved fruits, the Exhibition contained many examples; including some which had been prepared with sugar and subsequently dried, and others preserved and kept in syrup.

In the most ancient times, honey constituted the principal and nearly the only sweet substance used for those purposes for which sugar is now almost universally employed; and the Egyptian department in the Exhibition furnishes evidence that its use for the preservation of fruit is still continued in the valley of the Nile. Many interesting specimens of the most simple forms of conserves are also contained in the Turkish and Tunisian collections, consisting of the desiccated pulp of prunes or juice of the grape. It is possible that the former preparation may somewhat resemble the "cakes of figs" of the ancient Hebrews, which, from the two passages of Scripture wherein they are mentioned (1 *Samuel*, xxv. 18, xxx. 12), were evidently regarded as agreeable and nutritious food. That the Jews had some kind of artificial sweet preparation at a very early period of their history, is indicated by the statement, that the taste of the manna "was like wafers made with honey" (*Exodus*, xvi. 31), though the parallel passage in *Numbers*, xi. 8, expresses it to have been like "fresh oil." The word Confection, and the term Confectionaries, as they occur in the Scriptures, have two distinct significations in connection with this particular subject. In the first instance, the strict original sense of the expression as derived from *con* and *facere*, to make up together, is intended; as in the words "thou shalt make it a perfume, a *confection* after the art of the apothecary, tempered together pure and holy," *Exodus*, xxx. 35. When, however, Samuel says to the elders of Israel concerning their king, that he would take their "daughters to be *confectionaries*, and to be cooks and to be bakers" (1 *Samuel*, viii. 13), there is a special and a distinct employment of the makers of some kind of conserves or sweet-preparations referred to, of which no decided information is extant. From two well-known remarkable passages in the Prophets, there can be little doubt that the Hebrews were acquainted with the existence of the sugar-cane, probably as it was found in China.* They both prove, however, that it was a very costly rarity; and the three words which in the Scriptures denote sweet substances, are all rendered honey in the Authorized Translation, though possibly they indicated several kinds of it. The passages which are supposed to refer to sugar are very different from these. "Thou hast bought me no *sweet-cane* with money," says the remonstrance in *Isaiah*, xliii. 24; and "To what purpose cometh there to me incense from Sheba, and the *sweet-cane* from a far country?" is the complaint in *Jeremiah*, vi. 20. In both these places the allusion is to an offering to the Almighty, which, presented in a right spirit, would not have been rejected. This, therefore, could not have been honey, because in *Leviticus*, ii. 11, the positive command is given, "Ye shall burn no leaven, nor any honey, in any offering of the Lord made by fire." The substance referred to must therefore have been either the sugar-cane, or the aromatic sweet-rush. The word rendered Calamus in *Exodus*, xxx. 23, in the direction for making the

* The earliest records of China make mention of the culture of the sugar-cane and the extraction of the sugar; the application of which as food appears to have been known in the most remote ages of Chinese history.

anointing-oil for the furniture of the tabernacle is also *Kench Bosen*, or sweet-cane, in the original; but this is generally supposed to mean the Indian *Calamus Aromaticus*.

Although the cane-sugar of Asia must have been well known to the classical ancients, yet they seem to have regarded it as a kind of factitious honey. In this form Herodotus* appears to refer to it, when he says that the Gyzantes have bees "which make a great quantity of honey, and it is said that confectioners make much more." The original words of the historian in this place have the general signification of compounders, or workers, for the people.† From the context, however, it is evident that the terms are to be understood as implying preparers of confections, as they are also in another passage of the same author, wherein it is stated that the confectioners of the city of Calletabus "make honey with tamarisk and wheat." It may be observed further that the same word is likewise used in the title of the fragment of an epigram, attributed to Menander, relating to the making of a bride-cake. It consists of a short conversation, in which the operator represents that he has watched the preparation all night, but that there is yet much to be done. Such a person as this, who understood the art of confectionary, as retained by the wealthy Romans, was called *Pistor Dulciarius*, or a baker of sweet things; and several of the bronze moulds which the pastry-cooks of the time employed for the making of their sweetmeats, representing hearts, striated-shells, animals, and a variety of elegant devices, have been discovered at Herculaneum. About the same period, also, Apicius, Columella, and Pliny prove that some fruits at least were preserved in syrup. The last author recommends that quinces should be boiled in honey; and directs that other sorts should be enclosed in wax. The latter process Beckmann states to have been likewise employed for preserving the apples carried every year from the southern districts of Russia into the northern parts of Sicily.

But though the value of sugar as a luxury was not unknown to the ancients, it was, from its first introduction to a comparatively late period, more commonly employed by physicians for the disguising of disagreeable medicines, and in the pharmaceutical preparation of syrups, electuaries, and confections. This practice appears to have led to the intimate connection which so long existed between the preparation of conserves and the compounding of drugs. Actuarius, who is considered to have flourished between the twelfth and fourteenth centuries, is said to have been the first physician who substituted sugar for honey in medicinal compositions; about which time also it was frequently used in cooking in England.‡ Dioscorides, in the first century, is the earliest author by whom it is mentioned by name, and he also notices its medicinal properties.

The art of making sweet compositions being thus early associated with the occupation of the apothecary, and his productions being known under the general title of confections, the same name appears, for a time at least, to have been used for the preparers both of sweetmeats and of medicine. In the thirteenth and

* Melpomene, xciv., cited in Pereira's *Elements of the Materia-Medica*, 2nd Edit., li. p. 695. *Herodotus*, a New Translation, by the Rev. H. Cary, 1848.

† *Δημιουργοὶ ἄνθρωποι*. Ἀντὶς δημιουργοῖ, *Polymnia*, xxxi.

‡ *The Forms of Cury*: edited by the Rev. S. Pegge, p. xxi.

fourteenth centuries, there were certain officers called apothecaries retained by princes and great personages, who prepared various preserves for the table, especially fruit incrusted with sugar; but it is quite possible that these individuals were sometimes ecclesiastics, who also possessed the knowledge of medicine and pharmacy. Beckmann has recorded many curious notices illustrative of the connection existing between the professions of the apothecary and the confectioner, as they were publicly established in Germany from the middle of the fifteenth century. From these statements it is evident, that the term *apothecarius* was then understood to signify the keeper of a storehouse or magazine for articles belonging to the *Materia-medica*, where also medicines might be properly compounded, and confections and cooling liquors prepared for the sick. These establishments were licensed by authority, and the persons who kept them endowed with exclusive rights and municipal privileges; in return for which they were sometimes required to supply the court or the town-council with confectionary or sugar, as well as to vend their medicines at appointed rates.

It is probable that in such a stipulation of furnishing confections and sugar to public authorities, originated the practice which became common in England in the sixteenth century, of presenting rich boxes of sweetmeats or lozenges to great personages on their journeys, or at certain seasons; or pastry of elaborate ornament as royal new year's gifts.* Many curious instances of the latter custom will be found in the lists of new year's gifts made to Queen Elizabeth, of which the two following may here be adduced in illustration, as they include sweetmeats, preserved-fruits, and pastry:—"1562. By Revell, surveour of the works; a marchpane, with the modell of Powle's church and steeple in paste. By John Hemingway, *poticary*; a pott of orange-condytt, a box of pyne-comfyfts, musked, a box of manus-christi, and lozenges."

Before this period, the practice of the confectionary art had ceased to be confined solely to the compounders of medicine, and its productions had long since been regarded as belonging rather to festivals and banquets than to the dietaries of the sick. The delicacy and rarity of the articles used in confections, and the neat dexterity required in preparing them, probably suggested it as a most graceful female employment; hence we find that, in the seventeenth century, the art of making sweetmeats became established as a fashionable feminine accomplishment, and was publicly taught both in France and England.

Manufacture of Comfits and other Bonbons.

The following is a description of the processes employed at the manufactory of Mr. SCHOOLING, one of the Exhibitors, of Bethnal Green, the workmen being chiefly French.

Smooth-Comfits.—The preparation of comfits is very simple. If seeds, such as almonds, or carraway-seeds, are to be made into comfits, they are placed together with a cream made of sugar-syrup and starch, into a flat ellipsoidal copper pan, suspended by chains over a charcoal-fire. By tilting the pan up and down, and at

* This custom is still kept up in France, as regards the presentation of boxes of sweetmeats on the first day of the new year; and will be noticed in speaking of the contributions from that country.

the same time giving it a circular swinging motion, the seeds are made to roll one over the other, and thus gather the pasty mixture as it dries. This operation is repeated as often as may be required for the seeds to accumulate a sufficient thickness. The form of the seed governs that of the comfit.

Pearled-Comfits.—Cinnamon, coriander-seed, and celery-seed, are usually "pearled" by placing the mixture of syrup and starch into a copper funnel, suspended over the pan containing the comfits or seeds. This funnel is, in shape, like the small half of an egg, and has a round hole in the bottom, which is more or less closed by a long conical stick, suspended to the handle of the funnel, and passing through a guide to keep it central. By allowing the plug to descend sufficiently, it may be made to close the hole. The aperture is regulated in such a manner as to allow the mixture merely to fall in drops; at the same time, a short jerking motion is given to the pan. The paste, as it dries, gathers on the comfits in little knobs, called pearls.

Machinery for making Comfits.—Mr. Schooling employs the following simple contrivance. An endless-band, formed of strips of iron hoop riveted on two leather straps, traverses over four rollers, so placed that their axes, when seen on end, form an irregular square, the top roller at that end towards which the band travels being much higher than the top roller at the opposite end. The metallic band is not drawn tight, but left loose in order that it may form a sort of bag to contain the materials, by drooping between the top rollers; the frame of the machine forming the ends of the bag. A coil of steam-pipes, following the curve of the band, serves to dry the comfits, which are gathered with a rolling motion up towards the highest side, and then rolled over in a contrary direction.

Another Exhibitor, Mr. WOTHERSPOON, of Edinburgh, employs an apparatus consisting of a steam-pan, open at one end, and revolving in a vertical direction on a hollow axis, through which the steam passes in and the condensed water passes out. This pan is in shape like an orange, supposing a horizontal axis to be placed in the eye, and a disc of about a third part of the diameter of the orange to be cut out of the rind at the side opposite to the axis; and in order to complete the simile, supposing that the rind to be hollow so as to contain steam. The seeds and syrup are placed at the open end, and by the slow revolution of the copper-pan, are gathered up and rolled over in the same manner as on the endless band.

Messrs. OUDARD, SON, and BOUCHEROT, of Paris, also manufacture comfits by steam-machinery, and have done so since 1844: before this period a skilful workman could make from 45 lbs. to 55 lbs. per day, but at present he superintends six pans, each of which produces 112 lbs., so that in a day he manufactures 6 cwt., or twelve times as much as he could produce by hand. This machinery, having been adopted by other Parisian confectioners, has caused a reduction of 30 per cent. in the price of comfits in France.

Sugar-Pastilles are made of a paste of powdered sugar and syrup, combined with such flavouring and colouring matter as may be required. A small quantity of this paste is heated over a charcoal-fire, and then placed in a spouted-ladle. By inclining the ladle, a small quantity oozes out at the spout, and is cut off with a wire; the drop, as it falls on a tin-plate, forms a flattened semi-ellipsoid; as soon as

the tin plate is covered, it is removed to the drying-stove. A single workman, in this way, can make three or four hundred-weight of pastilles in a day.

Jujubes are composed of a mixture of gum-mucilage and syrup, which is run into flat tin-trays, and consolidated by evaporation in a chamber heated by steam. As soon as the cake has been sufficiently dried, it is allowed to cool, and is then cut into long strips by passing it through a pair of rollers, the bottom one being a plain cylinder, and the top one composed of a number of discs placed on an axis and kept apart at the required distance by collars; the strips are afterwards cut transversely with scissors.

Motto or Surprise-nuts are made by drilling out the thick end of the nut with a rose-cutter running in a lathe; the kernel is then removed, and the shell filled with mottos and comfits, and lastly stopped up with chocolate. Many tons are made annually by Mr. Schooling.

Liqueur-Bonbons.—The manner of making liqueur-bonbons is nearly the same, whatever may be their shape. A syrup is made with water and sugar, and is then taken a little at a time by the workman, who evaporates it to the proper consistence, and adds alcohol or some alcoholic liquor. In the mean time his assistants have prepared several moulds, by filling shallow trays with powdered starch, and impressing plaster-of-Paris models of the required form into it, so as to produce corresponding depressions. Several models are fastened on a rod, and thus a number of matrices are made at one operation. The workman then takes a portion of syrup, and runs it into the moulds either from the egg-shaped funnel, before spoken of, or from ladles having several spouts, according to the nature of his work; the latter being used for small drops, the former for large bonbons. The cohesion of the syrup being greater than its attraction for the starch, it runs away from the latter as water does from an oily surface; and the upper surface thus takes a spheroidal form. A little starch is now sifted over the surface of the mould, and it is then set aside in a warm closet. Crystallization commences on the outside of the bonbon, and forms a crust which encloses the syrup; this gradually yields more and more of its sugar, and becomes itself more dilute. In this way a man and two boys will run off about 3 cwt. of bonbons per day.

Liqueur-Almonds.—Almond-shaped liqueur-bonbons, which contain a syrup, are enveloped with the white mixture in the same way as smooth-comfits; but, in order that they may not be destroyed in the operation, they are first covered with gum-mucilage, and then thrown into a mixture of gum-arabic and sugar reduced to a fine powder: they are afterwards dried, and again submitted to the same operation as often as is necessary to produce a coating of the desired thickness.

Solid Sugar-bonbons are cast in the same way, but with a much stronger syrup.

Gum-Drops.—Gum raspberries are made of syrup and gum-mucilage; they are cast in the same manner, and dried to an elastic solid.

Fondants, which melt like ice in the mouth, are likewise run into starch-moulds: they are composed of a syrup, which is first evaporated to a certain point of concentration, and then beaten until it forms a frothy paste.

Crystallized Bonbons.—All the different kinds of sweetmeats hitherto described

are sometimes covered with a crystalline coating of sugar, by putting them into a strong syrup contained in shallow trays placed on shelves in a drying-chamber heated by steam. A piece of linen is laid on the surface of the syrup to prevent its forming a crust; and by lifting this linen from time to time, the progress of the operation is ascertained: this usually occupies from one to two days. The excess of syrup is drained off in the same room, as soon as the sweetmeats are sufficiently covered with crystals of sugar; they are then removed and air-dried.

Flowers, Piping.—All piped-ornaments are composed of a mixture of white of egg and sugar, which is called "glazing." For the modelling of flowers the workman uses a series of supports which, at the upper part, are of such a shape that they would nearly fit the under side of the flower; a depression being made in the summit to suit the shape of the calyx. The modelling-tools consist of a series of small funnel-ends not much bigger than a thimble, with openings of various shapes as, for example, narrow slits of different breadths, and round and other shaped holes of various sizes. These funnel-ends are fastened with gum to the bottom of paper funnels, into which the workman places the glazing, and then closes the funnel by doubling over the paper. By pressing the paper funnel with the thumb, he squeezes out just what he requires; and by dexterous manipulation, curls and twists it into any form he chooses. This operation is called piping, and is much employed in ornamenting bride-cakes.

Painted Bonbons.—Bonbons intended to be painted are covered with a layer of glazing, and are then ornamented with coloured piping. The last finish is given by painting them with body-colours, mixed with gum-mucilage and syrup. The nature of the colours will be described hereafter in speaking of the contributions from France.

Manufacture of Chocolate—Confectionary.

The following is the method practised by the Paris Chocolate Company, who in Class VI. have exhibited their machinery, which was made by M. G. Hermann, of No. 92 Rue de Charenton, Paris.

The cocos, or cacao nuts, are first screened to remove any dust, and are then roasted in a cylindrical or globular vessel, which revolves over a fire; the operation of roasting being one requiring much care and attention. After roasting, the husk is beaten off by means of a winnowing-machine. The roasted nuts are now placed in a triturating or mortar mill, encased with an outer jacket, and heated to 50° C. (122° F.) by means of steam; by the action of this machine they are reduced to a thin paste, on account of the large quantity of oil which they contain. Sugar previously separately ground in a similar, but cold, mill, is now added, and the action of the hot-mill continued until it is well mixed with the cocoa-paste; vanilla is also added if the chocolate is to be flavoured with it.

The thick paste of sugar and cocoa is then levigated to the utmost degree of fineness by means of a mill formed of three rollers working in a horizontal plane; the second cylinder revolving at twice the speed of the first, and the third at twice the speed of the second. The chocolate-paste is put into a long funnel or "hopper," fixed over the two first rollers, which draw down a certain quantity on their surfaces, and by their mutual pressure, and difference of speed, spread it into a thin and even coating. The third roller, by working at a still quicker speed,

produces a farther grinding of the paste, which is scraped off by a ductor-knife and returned once or twice to the mill. A coil of steam-pipes placed under the machine prevents the cooling of the paste during the operation.

The manipulations of chocolate for confectionary are very similar to those already described for sugar-confectionary.

UNITED STATES OF AMERICA.

The preservation of soft fruits in brandy is an art of some importance in the United States, and one which every year is becoming better understood. The peach is the favourite conserve, large quantities of which are annually prepared, chiefly for home-consumption; but from the experience which the Exhibition has afforded of the possibility of sending them to England in a state of perfect preservation, there is but little doubt that they will soon traverse the Atlantic. The white Heath-peach is that deservedly most esteemed. Two American Exhibitors have sent Brandy-peaches.

BRITISH COLONIES.

Canada sends an unimportant contribution of confectionary, consisting of Horehound-candy, reputed in Canada to be a most excellent specific for a cold; a merit which an experiment did not confirm: and also another of Raspberry-vinegar.

From the *Cape of Good Hope* there is a collection of several kinds of conserved Fruits, which for the most part were found to be in a good state of preservation. Some are in syrup, and others partially dried. *Van Diemen's Land* has contributed Raspberry- and currant-jam, Green gooseberry-jam, Red gooseberry-jam, and Quince-jam.

CHINA.

The only description of confectionary in the Chinese section is the Finger-citron (*Citrus sarcodactylus*) preserved in syrup. Large quantities of sugar conserves of various kinds are, however, made in China, and it would have been interesting to compare them with those from other countries: jams, jellies, dry-conserves, and syrups, are such as most resemble those of Europe; but beside these, are preserved seeds, as the Millet-seed, roots, for example, the root of the *Nelumbium*, and the young tender shoots of various plants, as the bamboo.

The trade in these preparations is very extensive, both at Canton and Ningpo; and from the town of Foo-tchou 44,000lbs. were exported during the first half of the year 1846.*

EGYPT.

The contributions from Egypt are very interesting, as representing not only the confectioner's art in Egypt at the present time, but also as offering to our view conserves probably identical with those of ancient history: they consist of Dates preserved in honey, from two Exhibitors; one description is a preserve in clarified white, the other in dark-coloured honey. Beside these, there is a small quantity of Sugar-candy.

* *Etude pratique du Commerce d'Exportation de la Chine*, par Natalis Rondot, pp. 69, 70.

FRANCE

The preservation of fruit in sugar, and the manufacture of sugar- and chocolate-confectionary, are highly important branches of industry in France; important, not only from the number of workpeople immediately employed in these manufactures, but also on account of several tributary arts connected with them, which occupy even a far greater number. The artist, the lithographer, the colourer, the varnisher, the paper-maker, the pasteboard-maker, the die-sinker, the embosser, the fancy-braid-maker, the gold- and silver-beater, and even the silk-weaver, are all more or less dependent on the demand for fancy boxes and "*cornets*" to contain bonbons and fruit: indeed, the trade of fancy-box-making owes its existence to the wants of the confectioner, who is still its chief patron. Other trades, appreciating the convenience and attractiveness of a pleasing envelope, have adopted boxes for most of their small wares; and "*Cartonnage*" has now become quite gigantic in its development, employing upwards of Two thousand artisans, both male and female. Paris is the chief centre of the manufactories, which for many months towards the close of each year are all busily employed in preparing the enormous quantities of boxes, mostly distributed in a single day, the first of the new year, to the ladies of France. Many of these boxes cost the confectioner from 12s. to 40s. each, and when filled with confectionary, sell at enormous prices. The greater part, however, cost from 2d. to 2s. 6d. The preservation of whole fruits in sugar is carried on chiefly in the southern parts of France, by small collectors, who forward their produce to their correspondents in Paris. The Parisian confectioners then re-select them, cutting some into ribands, rings, and other fanciful forms, and arrange them in boxes for sale. Paris, on the other hand, supplies boxes to the departmental collectors, who put up in them their fruits for exportation. It is mainly owing to the great taste which the French display, not only in the boxes, but also in the arrangement of the fruit, that they have gained almost a monopoly in supplying the world with conserves: the selection of the fruit and its perfect preservation, however, are points which are carefully attended to, so as to perpetuate the reputation of the goods which an attractive exterior first brings into notice. Eight Exhibitors have sent fruits preserved in sugar, chiefly in syrup.

Chocolate-Confectionary is entirely of French invention, and is the kind of sweetmeat most esteemed in France. Its manufacture, however, is chiefly concentrated in Paris, and gives employment to about Four hundred workpeople, the value of the annual produce being 160,000*l.* It is owing to the great attention which the French machinist has bestowed on the construction of the machinery employed in its preparation for the triturating and grinding processes, that the art has been carried to its present high state of perfection. Other nations are adopting French methods, and employing French workmen to attain a similar end. The French confectioner also displays much ingenious skill in casting a great variety of subjects in chocolate, which are usually afterwards covered with preparations of sugar ("*glazing*"), and coloured to represent the natural objects. The moulds, in which the casting is effected, are made of sheet-copper hammered to the required shape. Fruit, vegetables, cockchafers, spiders, and other insects, are the subjects most frequently produced.

There are Three Exhibitors of Chocolate-confectionary in the French Section.

Sugar-Confectionary is manufactured in France even to a much greater extent than chocolate-confectionary, and is that which is chiefly exported. Paris, the great centre of this branch of industry, employs Seven hundred workpeople, males and females. The wages of the men average 3s. 4d. per day, and those of the women 8d. The value of its annual produce is 280,000*l.* The French confectioner is not a mere manufacturer of shapeless sweets, he is an artist; he studies not only the elegance of form in each bonbon, but also pays the minutest attention to the attractiveness of the grouping, and the correct contrasting of the colours. His ingenuity and invention are inexhaustible; every season he produces some novelty, and for years this competition has continued between himself and his rivals; and yet there is no abatement in his ardour or his success: now his production consists of a new box; now of some intricate interlacing of fruits; now of some wonderful crystallizations; and now of some new mode of concealing the motto: but in most cases his art is exerted tastefully to introduce a looking-glass. No house enjoys a higher reputation in Paris than its single representative of this art in the Great Exhibition.

In 1850, the exports from France, of syrups, sweetmeats, marmalades, jellies, and fruits preserved in sugar amounted to 983,350 lbs., in value 36,000*l.*

The French confectioner is not permitted to employ any substance he chooses, either in the manufacture of his sweets or the colours he uses to adorn them; the Minister of Agriculture and Commerce very properly interfering. He directs that the Prefect of each town shall carry out, in a proper manner, the instructions which have been laid down by scientific men; not only as to the materials employed, but also as to the coloured-papers used to envelope the sweets. These regulations, it will be observed, are very similar to those which were established for the government of the Apothecary-Confectioners of Germany in the fifteenth century; and it would be well if England took a lesson in this respect, and appointed a competent staff of chemists to examine from time to time the sweetmeats which are exposed for sale in the retail-shops.

The following list of colours, allowed by the French authorities to be used by confectioners, may be found of service to makers of sweetmeats in other countries:—

Blues.—Indigo dissolved in sulphuric acid; Prussian-blue; to which may be added Ultramarine, as preferable to Prussian-blue.

Reds.—Cochineal, Carmine, Carmine-lake (provided it contains no vermillion), Brazil wood lake.

Yellows.—Saffron, French-berries, Persian-berries, Quercitron, Turmeric, Fustic, and the aluminous lakes of these substances.

Green is produced of different shades by mixing the various yellows and blues; but no kind of emerald-green must ever be employed, as it is a virulent poison.

Violet.—Logwood alone or mixed with bronze-blue (Chinese blue), in various proportions.

Pansy-colour.—Carmine and Prussian blue; or Carmine and Ultramarine mixed in various proportions.

Colours for Liqueurs. Curaçoa is coloured with Brazil wood; blues are made with indigo prepared by adding alcohol to the sulphuric solution of indigo; and absinthe (wormwood) is tinted with a mixture of saffron and alcoholic indigo.

INDIA.

India sends a few Preserved-fruits, amongst them some pine-apples ; but they have not arrived in good condition.

PORTUGAL.

There are as many Exhibitors of Conserved-fruit in the Portuguese as in the French Section, and the fruits leave nothing to desire in their preparation ; but the Portuguese do not display the same taste in their arrangement, and lack for that purpose the charming paper-boxes which render the French fruit so presentable ; hence the commerce in this article is much less flourishing than in France. The exports of Portugal are principally to Russia and Brazil ; but a fair proportion comes to England. The preservation and arrangement of fruits are principally carried on in the nunneries, excepting only in the town of Evora-Elvas, which has lately taken a great start, and established regular manufactories. Eight Portuguese Exhibitors have contributed conserves ; and One other a small quantity of comfits.

PRUSSIA.

One Exhibitor sends most excellent Preserves in Syrup. These conserves are an evidence that the art is perfectly understood in Prussia, and carefully practised. There is, likewise, an Exhibitor of Chocolate-confectionary, whose productions, however, are far behind those of France.

RUSSIA.

From this country there has been sent a small collection of various Crystallized-fruits and marmalades, prepared in the Government of Smolensky. The collection comprises oranges, green-gages, apples, cherries, bergamotte-pears, pine-apples, and marmalades of different kinds. Though no Award has been made for these conserves, which had somewhat suffered, there was sufficient evidence of their having been so well preserved as to warrant a favourable notice being given of them in this Report.

SARDINIA.

From the Duchy of Genoa, several preserved Fruits in Syrup, crystallized sugar conserves, and a small quantity of *Dragées*, are sent by One Exhibitor, G. ROMANENGO ; but, unfortunately, the bottles were so insecurely packed that the syrup had oozed out, which left the fruits in a bad condition ; the fruits in boxes are, however, excellent. The comfits are well made, but not equal to those exhibited in the French Department. The conserves of the Sardinian States are much esteemed, and form an important and increasing article of commerce. In the Duchy of Genoa there were, in 1843, 34 confectioners, who employed 146 workpeople, and produced 637,190 lbs. of sugar conserves, valued at 34,400*l.* ; in 1846, 34 confectioners, who employed 150 workpeople, and produced 661,457 lbs. of sugar conserves, valued at 36,000*l.* ; in 1847, the value of the conserves was 48,000*l.* ; in 1848, the value of the conserves was 46,800*l.* In 1843, there were also Twelve establishments for preserving fruits in the province of Nice.

SAXONY.

The contribution from this country consists only of a very large collection of Chocolate-figures, modelled with skill; several of the comic subjects are, however, of rather questionable propriety. The quality of the chocolate of which they were composed did not warrant an Award in favour of the Exhibitor, though he had made considerable exertions to produce a good display.

SPAIN.

Several kinds of Fruit preserved with sugar and dried, and others in syrup, are sent from Spain by Two Exhibitors. These conserves are partly prepared in the convents, and partly in private manufactories. The quality of the fruit is unexceptionable; but in Spain, as in Portugal, there is felt the want of ornamental boxes, in order to set it off to the best advantage.

SWITZERLAND.

One Exhibitor sends a small quantity of Chocolate-lozenges of fair quality.

TUNIS.

The only contribution from this country is a small quantity of a sweetmeat, called *Kefta*, which is made of the dried juice of the grape, and is not unpleasant in flavour.

TURKEY.

No distinct Award has been made for the sweetmeats supplied from this empire, which are very numerous; for the reason before stated in speaking of soap and candles. The Turkish confectionary has, in many cases, the peculiarity of being flavoured either with musk or otto-of-roses. The most remarkable is a sweetmeat called *Rahatlocoum*; it is composed of one part of wheat-starch, six parts of sugar, and twelve parts of water; these are boiled together for some time, and when the mixture has lost so much of the water by evaporation that it will congeal to an elastic jujube-like mass, it is run into a flat tray and allowed to cool: sometimes blanched-almonds are mixed with it. This preparation, which is of agreeable flavour, is in great repute amongst the Turkish ladies, from its alleged property of developing those proportions of figure which, in their country, are deemed a most essential attribute of female beauty. About 600 tons of *Rahatlocoum* are made annually in Turkey.

The following Conserves also find a place in the Turkish collection: *Kufta-anjou*, prepared from the dried juice of the grape; *Kufta-anjou* with blanched almonds; *Pastia*, which is also prepared from grape-juice dried quite hard in thin scales; the pulp of the Persian prune (this has by no means an agreeable flavour); pistachio-nut-comfits; roots preserved in sugar and flavoured with musk; very good marmalade of plums; sugar-candy, pink and white; liquorice-syrup; and lastly, dried liquorice-juice. Of all these the most agreeable is without doubt the *Rahatlocoum*.

UNITED KINGDOM.

ENGLAND derives her supply of fruits preserved in sugar from countries more favoured than herself in climate, large quantities being annually imported from France (chiefly), Spain, Portugal, and her various colonies. The weight of fruits preserved in sugar or brandy, imported from all parts, during the year 1850, was 155,895 lbs., and yielded in duty 3,754*l*. There is One Exhibitor of foreign Preserved-fruits in the British Section. English jams, jellies, and orange-marmalade, which are prepared very largely throughout the United Kingdom, are not exhibited, probably under the idea that no interest would be attached to them.

Confectionary is manufactured, in enormous quantities, throughout the United Kingdom, and more particularly in Scotland. It is not possible to arrive at an exact knowledge of the quantity annually produced, nor even to make a tolerably accurate estimate as to its extent; but it is certain that two or three tons per week of lozenges are not an unusual produce for one house. From the result of inquiries amongst the sugar-brokers and confectioners, it may be safely stated that upwards of 150 tons of sugar are converted, every week, into sweetmeats; at 47*l*. per ton, the raw material used in one year, therefore, amounts to 366,600*l*., to which must be added labour, flavouring, and a wholesale and retail profit. Besides this, 31,977 lbs. of Confectionary are annually imported, and pay a duty of 840*l*.

The manufacture of Chocolate-confectionary is only of recent introduction into England, and is carried on by Frenchmen and Italians, Two of whom exhibit their apparatus at work in Class VI. There are Three Exhibitors of Chocolate-confectionary in the British Department, One of whom exhibited chocolate quite equal to that made in France.

Crystallized Liqueur-confectionary, similar to that of France, is now made largely in England, and is quite equal in quality, but at a considerably less price than the French. This arises, to some extent, from the difference in the price of sugar, and also because the cane-sugar is more easily worked, or, as the workman expresses it, is stronger. For example, crystallized liqueur-beans, *dragées*, and "drops" of English manufacture, are sold wholesale at 8*d*. per lb., the price in France being 1*s*. 3*d*. As wages are considerably higher in England, the difference in price is the more remarkable.

By far the larger portion of sugar annually devoted to sweetmeats, is carried off by "pipe," lozenges, and comfits of different kinds. The latter description is made chiefly in Scotland, which has long been renowned for its confectionary. Machinery is employed, particularly in the manufacture of lozenges, acidulated-drops, and comfits, so that the wholesale-confectioner is enabled to sell these kinds at prices but little above those of the raw materials; notwithstanding this, an unfair competition seeks still farther to diminish the price by admixtures of powdered gypsum. The acidulated-drop is a production peculiar to this country, the foreign confectioners not understanding its manufacture.

Bride-cakes are not wanting in the World's Great Show, nor should they be; for they are characteristic of English tenacity with respect to ancient customs, and few are older than the use of bread or cake at marriage-ceremonies, which, with the wedding-ring, has been derived from the heathens. The sprinkling of wheat on

the head of the bride is a very old custom, and is now occasionally perpetuated by the cutting of the cake over her head. Many other ceremonies are also still retained in connection with the bride-cake; as the passing of very small pieces of it nine times through the bride's ring, in order that the bridesmaids may place a piece beneath their pillows at night and dream of their lovers. No less than Three gigantic Bride-cakes adorn the counters of the North Transept Gallery, varying in value from 30*l.* to no less a sum than 150*l.* One, it is said, possesses the advantage of moveable ornaments, so that after the cake has disappeared, the sugar may be transmitted, like the silk-dresses of our ancestors, as an heir-loom from the grandmother to her granddaughter! The Three Exhibitors are R. GUNTER, MOORE and MURPHY, and R. VINE. Although these bride-cakes were not considered of sufficient importance in a mercantile point of view to warrant the Jury in making them the subjects of a distinct Award, they are here mentioned as being the best of their class. The sugar-ornament of the last named is quite remarkable as a piece of "sugar-piping."

The number of British Exhibitors of Sugar-confectionary is Eleven. There are likewise Two Exhibitors of Confectioners' ornaments, and Three Exhibitors of Biscuits.

WURTEMBERG.

To judge by the contributions to the Exhibition, the forte of the Wurtemberg confectioners is rather in the production of non-edible ornaments than confectionary itself; there being Three Exhibitors of the former, and only One of the latter. The confectionary which is crystallized is, however, excellent.

The number of Exhibitors in this subdivision is Sixty-six, of these there are:—

17 Holders of a Prize Medal.
5 Who obtained Honourable Mention.
44 Unrewarded.

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66
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The classification of Exhibitors, according to the various countries, is as follows:—

America - - - - -	2	Russia - - - - -	1
British Colonies:—		Sardinia - - - - -	1
Canada - - - - -	2	Saxony - - - - -	1
Cape of Good Hope - - -	1	Spain - - - - -	2
Van Diemen's Land - - -	1	Switzerland - - - - -	1
China - - - - -	1	Tunis - - - - -	1
Egypt - - - - -	2	Turkey - - - - -	1
France - - - - -	13	United Kingdom - - - -	20
India - - - - -	1	Wurtemberg - - - - -	4
Portugal - - - - -	9		—
Prussia - - - - -	2	Total - - - - -	66
	—34		—

Of these, Thirty exhibit Fruits preserved in syrup or brandy; Eighteen exhibit Sugar-confectionary; Nine, Chocolate-confectionary; and Five Confectioners' ornaments; the remaining Four exhibit sweet-biscuits.

LIST OF AWARDS.

ALVARGONZALEZ, R., Oviedo (Spain, No. 177). Prize Medal. Fruit exceedingly well preserved in syrup; comprising Greengages, Peaches, Apricots, and Strawberries.

AUCLERC (Widow), and P. LEDOUX, Paris (France, No. 1059). Prize Medal, for an assortment of French Comfits, Liqueur-bonbons, and *Pastillage*-figures (composed of sugar and white of egg, or sugar, gum, and starch). The bonbons are arranged with great taste in fancy boxes and *corbeilles*, and much skill is displayed in the modelling of the *pastillage*-figures.

BAUR BROTHERS, Biberach (Wurtemberg, No. 87). Prize Medal, for a very extensive collection of Confectioners' ornaments, many of which are very humorous. They are composed of gum-tragacanth, and starch, so that if eaten no ill effects would arise, but they are intended only as ornaments. The largest piece represents the Cathedral of Cologne, and contains a musical-box. In Germany, storks are reputed to bring newly-born infants, and we find, accordingly, one of these birds carrying a child in a small box strapped on his back.

CASTELLAR, F., Lisbon (Portugal, Nos. 422 to 425, 426, 428 to 433, 438). Prize Medal. Figs, Plums, Peaches, and Pears as dry conserves; Sweet-Plums, Apricots, Tangerine-oranges, Figs, Cherries, and Peaches preserved in syrup with their natural flavour and perfectly sound.

CHEVET, jun., Paris (France, No. 121). Prize Medal. Cherries, Pears, Apricots, and other fruits preserved in syrup. These are of the highest class, both as regards the choice of fruit and careful preparation.

COIMBRA, THE NUNNERY OF (Portugal, No. 417). Prize Medal, for a large and tastefully arranged box of Conserved-fruits in great variety, and in the highest state of perfection.

FORTNUM, MASON, and Co., Piccadilly (Class III., No. 55). Prize Medal (*the same Award by the Jury of Class III.*). A very extensive collection of the finest Preserved-fruits of various countries. For the care bestowed in the selection and arrangement of this (the largest) collection of costly conserves, the Jury has awarded the Prize Medal.

LOUDERBACK, M. J., Cincinnati (United States, No. 7). Prize Medal. White or Heath-peaches preserved in brandy, of delicious flavour, and in a perfect state of preservation. The name Heath is derived from the surname of the grower who first introduced them.

OULDARD, L. SON, and BOUCHEROT, Paris (France, No. 1374). Prize Medal, for the care in selecting, and taste in arranging, in ornamental forms and in boxes, a great variety of Preserved-fruits; and for Comfits and Sugared-almonds of excellent quality.

PARIS CHOCOLATE COMPANY, Regent Street (Class III., No. 30). Prize Medal, awarded for most excellent Chocolate-confectionary in a great variety of forms; all of which was found to be carefully prepared and well flavoured; and also for an assortment of Syrups, which on dilution form very agreeable and refreshing beverages.

PERRON, E., Paris (France, No. 343). Prize Medal (*the same Award by the Jury of Class III.*). Chocolate-confectionary, prepared in granite mills, and torrefied by

steam. This preparation is exhibited in a great variety of forms; amongst other matters, there is a Basket made of chocolate, filled with Chocolate-bonbons, which are well flavoured and are of most excellent quality.

PHILIPPE and CANAUD, Nantes (France, No. 956). Prize Medal. Excellent Fruits preserved in syrup, and comprising Peaches retaining the delicacy of their flavour, Pears, Raspberries, and Cherries, all of which are free from any signs of fermentation.

RODEL and SONS, Bordeaux (France, No. 992). Prize Medal, for a collection of the following fruits, perfectly preserved in syrup, viz :—Cherries, Pears, Apricots, Greengages, Raspberries, Peaches, and Strawberries, which have retained their natural flavour, and are free from fermentation.

ROTH, W., jun., Stuttgart (Wurtemberg, No. 89). Honourable Mention, accorded for a large collection of well-manufactured Liqueur-bonbons, both crystallized and smooth.

ST. PELAYO, THE NUNNERY OF, Oviedo (Spain). Prize Medal, for a collection of Marmalades of excellent flavour. They are of firm consistence, and are packed in thin round boxes.

SCHOOLING, H., Bethnal Green (Class XXIX., No. 114). Honourable Mention,* for Liqueur-bonbons agreeably flavoured and in every respect well-made, crystallized and smooth, generally known as French sweetmeats. Some of these are flavoured with artificial essences. (See pages 1347, 1348.)

TRÖGLEN, G., Ulm (Wurtemberg, No. 91). Honourable Mention is accorded to this Exhibitor, for a Confectioners' ornament, representing a Lion-hunt, well modelled in gum-tragacanth, sugar, and starch, and coloured with vegetable-colours.

TURPIN, F. A. (Widow), Paris (France, No. 1046), Prize Medal (*the same Award by the Jury of Class III.*), for a large collection of very excellent and carefully prepared Chocolate-confectionary, made up into *dragées*, and representing fruits and roots; for instance, potatoes, nuts, chestnuts, turnips, radishes, dates, black currants, hips, and plums; all of which are imitated with skill.

VOLSTEEDT, J. P. (Cape of Good Hope, No. 35). Honourable Mention is accorded for the following conserves, which are exhibited both in syrup and in the candied state, viz.: Nartjes (a small orange), the Bitter-orange, Green-figs, and Citrons.

WEATHERLEY, (H. Class III., No. 27). Honourable Mention. Sugar-drops, flavoured with artificial essences or compound-ethers, designated by names derived from their resemblance to the savour of various fruits; as essence of pear, of pine-apple, &c. (See pages 1347, 1348.) The major part of these drops are flavoured with a single compound-ether, but in some cases a combination of several is used.

WEILL, C., Berlin (Prussia, No. 20). Prize Medal (*an Honourable Mention accorded by the Jury of Class III.*). Whole Pine-apples, Peaches, Apricots, Pears, Plums, and Walnuts in the husks, preserved in syrup. The soft fruits have retained their natural flavour, and are quite free from fermentation.

* But for a misstatement contained in a label attached to these productions, by which it was made to appear that they were manufactured in France under the immediate inspection of the proper authorities, a Prize Medal would have been awarded to Mr. Schooling. The Reporters are now enabled to state that the employment of this label has been discontinued.

WOTHERSPOON, J. and Co, Glasgow (Class XXIX., No. 106). Prize Medal. Very excellent Scotch-confectionary, manufactured by steam machinery, and consisting of eighteen kinds of Lozenges and several descriptions of Comfits, which were found to contain no other material than sugar, starch, and vegetable-colouring.

B.—MANUFACTURES RELATING TO NATURAL HISTORY.

I.—ARTIFICIAL FLOWERS AND FRUIT.

Under this general designation two very distinct classes of articles have to be separately considered, namely, Imitative Flowers and Fruit, modelled in wax, and the same subjects formed from other materials. The Wax-flowers, from their fragility, are chiefly restricted in their application to purposes of decoration, and require less difficult manipulations for their successful production than those made of cambric, feathers, or similar materials, and destined for more general application. Wax-flowers are, however, occasionally used as articles of toilet.

In examining the Wax-flowers, which are usually intended to form isolated ornaments, we require truthful imitations of Nature, and taste in the selection of forms or grouping, the manufacturing skill required resolving itself almost wholly into the execution of form and the application of colours.

In the latter class, however, are included those productions to which the term "Artificial Flowers" is usually more especially applied; and it presents other qualifications besides those offered by the flowers modelled in wax, the artistic merits being more closely connected with the process of their manufacture. Accuracy of form and colour, and taste in the choice of examples and in the grouping, are of equal importance in the work; and there is usually more skill required for the imitation of the natural texture: but in addition to these qualities we have also to consider other peculiar excellencies of the articles produced, such as durability, the advantageous application of varied materials, and, finally, cheapness of production.

Such are the principles by which we have been guided in the examination of the several specimens of Artificial-flowers submitted to the Jury of this Class.

AUSTRIA.

The contributions from Austria are sent by Two Exhibitors, both of whom display small collections of cheap Miniature-flowers, in which the trifling cost is the chief merit.

BRAZIL.

The contributions from Brazil are only four in number, and undoubtedly the most beautiful of them is that belonging to Class XXIX., consisting of a splendid Bouquet of Feather-flowers, including the Coffee-, Cotton-, and Tobacco-flowers, &c. The name of the manufacturing artist was not stated; but an Award has been made in favour of the Exhibitor, who is an Englishman resident in London.

BRITISH COLONIES AND CHANNEL ISLANDS.

Many of the examples exhibited by the Dependencies of Great Britain have an especial and a very high interest attaching to them, since they may be supposed

to represent with sufficient accuracy a great variety of plants and fruits generally unknown in Europe. The Jury have not rewarded them as works possessing great artistic merit, but they nevertheless fully appreciate the laudable desire to impart information evinced by the numerous Colonial Exhibitors who have contributed the several specimens they record.

Bahama Islands.—The Mises GREIG send a bouquet and a vase made of brilliant shells, and Mrs. E. BARNETT, an important and very interesting collection of Thirty-two Wax models of Fruits, which appear to have been made and coloured with minute attention to accuracy in the imitation of Nature. But by far the most important contribution of this description is displayed by Three Exhibitors in the *Barbadoes* Department; though the whole of the specimens appear to have been executed by Mr. and Mrs. BRAITHWAITE, who are residents of that island. These examples, which are upwards of a hundred and fifty in number, comprise Bulbs, Roots, Plants, Flowers, Fruit, and Seeds, and reflect much credit on the modellers, for their attention to correctness of detail, a point of far greater importance than artistic grouping, when the intention, as in the present instance, is to convey a correct idea of the objects represented. *Guernsey* sends a small stand of Wax-fruit. *India*. The examples which have been collected from Gokak, in the Mahratta country, Travancore, and Rohilkund, comprise models of about seventy varieties of Flowers and Fruits. Although possessing but little artistic merit, these numerous specimens form a most interesting and instructive display. *Jamaica*. Mrs. NASH contributes several ornamental groups of flowers made of the fibres of the Yucca or Dagger-plant. *Malta*. ANTONIO GERADA and his DAUGHTERS exhibit a basket of rich Shell-flowers. *Mauritius*. The COUNTESS GREY sends a basket and Wreath of Flowers from the Séchelles Islands, made of Palm-leaves; and Madame CHAPON and the Mlles. GANCOURT contribute several Bouquets in Shell-work.

FRANCE.

It must be conceded that the manufacture of Cambric-flowers is a purely French, or, to speak more correctly, a Parisian art; for although its origin is Italian, and that it is now carried on in other countries, the productions are usually copies from French models. Indeed Cambric flower-making as much belongs to Paris as the manufacture of silks to Lyons, or ribbons to St. Etienne: and, to extend the parallel even still further, as cotton to Manchester or cutlery to Sheffield. The importance of the manufacture of cambric flowers will be better appreciated when it is stated that the value of these productions, in 1847, was 442,226*l.*; and notwithstanding the high import duties of 25 per cent. in England, of 33 per cent. in the United States, and of 40 per cent. in Russia, that French-made flowers to the declared value of 68,000*l.** were exported in the same year, principally to those countries, namely,—to Belgium 12,400*l.*, to the United Kingdom 12,120*l.*, to the United States 17,600*l.*, to all other parts 25,880*l.* No branch of industry presents a more complete instance of the subdivision of labour than artificial

* It is estimated that the selling value is nearly double this sum.

flower-making. Few of the manufacturers carry on all the operations on their own premises. Besides the cambric, muslin, gauze, velvet, silks, &c., supplied from Lyons, St. Quentin, and St. Etienne, there have been distinct manufactories established for many others of the component materials of these graceful ornaments. Thus the Dyes and Body-colours are prepared expressly for this art by manufacturing chemists; the materials, as Coloured-Papers, Buds, Leaves, Stamens, Pistils, Fruits, and similar articles, are usually made in workshops devoted exclusively to their production; and in some instances, as may be seen by the contributions to the Exhibition, only one description is made in one manufactory. In 1847 there were Forty-eight manufacturers of such materials in Paris, who employed 478 workpeople, and produced goods valued at 47,156*l*. The flowers are composed from their separate component parts in other workshops, some of which have a reputation for one kind only; and lastly, the grouping together of the various flowers is effected in the warehouses of the vendors, who are termed "*monteurs*," of whom, in 1847, there were 574 in Paris, who employed 5,675 workpeople, and produced goods to the value of 395,070*l*. It must, however, be stated, that there are some manufactories in which by far the greater number of these operations are carried on. In most cases, however, each workshop is restricted to the exercise of some particular branch. This will be more readily understood when it is stated that there are no fewer than Six hundred and twenty-two manufactories in Paris (including the forty-eight preparers of materials before named), which on the average annually produce goods amounting in value to 711*l*, supposing the total production equally distributed between them; but this is far from being the case, for in 1847,—

12	returned	.	.	.	8,000 <i>l</i> .
8	,,	from	4,000 <i>l</i> .	to	8,000 <i>l</i> .
33	,,	,,	2,000 <i>l</i> .	,,	4,000 <i>l</i> .
63	,,	,,	1,000 <i>l</i> .	,,	2,000 <i>l</i> .
131	,,	,,	400 <i>l</i> .	,,	1,000 <i>l</i> .
104	,,	,,	200 <i>l</i> .	,,	400 <i>l</i> .
182	,,	,,	40 <i>l</i> .	,,	400 <i>l</i> .
89	,,	less than	~		40 <i>l</i> .
622					

In 1847 there were 6,153 workpeople employed in cambric-flower making, namely:—

414	men.
5,063	women.
19	boys, from 6 to 16 years old.
657	girls ditto ditto.
6,153	

The men earn, on the average, 3*s*. per day, the women 1*s*. 7*d*. per day: the youths and girls, being mostly apprentices, receive, in most cases, no remuneration beyond their board and lodging.

Two of the Exhibitors, M. Constantin and M^r. Fürstenhoff, contribute specimens which show to what a surprising degree of perfection the imitation of nature may be carried in this art. Indeed, the productions of M. Constantin are so perfect

that they will allow of the scrutiny of a magnifying lens. In one instance, during the examination of his case, it was so doubtful, even with the aid of the glass, whether a real object had not been used, that the Exhibitor pulled a specimen to pieces to convince the Jury. Both M. Constantin and M^c. Fürstenhoff are, it appears, accomplished botanists, having followed regular courses of scientific study; and no higher proof could be afforded of the value of such training than the examples they display. It is productions such as theirs that have stimulated the manufacturers of articles of more general sale to improve their goods, by imitating, so far as is consistent with cheap production, the excellencies brought before them from time to time at the French *Expositions*. These periodical displays, by producing a healthful rivalry among the "*monteurs*," in the tasteful selection and grouping of the various flowers and leaves for articles of dress, have, in this respect also been of most essential service in developing the capabilities of this important trade. For however meritorious and commendable the truthful imitation of plants may be, this excellence is insufficient of itself to induce a large home consumption, or to create and maintain an extensive export trade. It is to the great talent of the Parisian "*monteurs*," in harmoniously grouping together a variety of stems, leaves, buds, and flowers, for head-wreaths, dress-trimmings, and bouquets, as much as to the skill of the makers of these flowers, that Paris owes its high reputation in this art; and so much diversity as to skill exists among the various artists, that it is known that the *same* flowers have a double value when arranged by one, to what they would have if by another of them.

HAMBURG.

The contribution consists of a Frame of Artificial Flowers, which does not call for any especial comment.

HESSE DARMSTADT.

Flowers and Fruit, modelled in wax, contributed by One Exhibitor, are average productions of their class.

MEXICO.

The contributions from Mexico comprise a few examples of Wax-flowers and Wax-fruit.

NASSAU.

A few specimens of Wax-fruits form the only contribution from Nassau in this Department.

PORTUGAL AND MADEIRA.

The Portuguese Department contains some excellent specimens of Cambric-flowers, partly contributed by M. CONSTANTIN, who, under his real name of MARQUES, pays this tribute to his native country. From the Island of Madeira are displayed specimens of those very beautiful Feather-flowers, for which it is so justly renowned. They are executed principally in the NUNNERY OF SANTA CLARA, in favour of which an Award was made. Other specimens are exhibited

in the North-East Central Gallery, contributed by an English Exhibitor. There is also an extensive series of Wax-fruits from H. FERRAZ and his SISTERS, which deserve favourable notice.

SWEDEN.

MADAME FÜRSTENHOFF, whose beautiful productions have been spoken of under the notice of France, adorns the department apportioned to her native country with a selection of her admirable imitations of Nature.

UNITED KINGDOM.

As the French may be regarded as superior in the construction of Cambric-flowers, so the British surpass all other Exhibitors in the manufacture of Wax-flowers. This is indeed as truly a British manufacture as the making of Cambric-flowers is French. In many instances those who practise the art are ladies, who having first acquired it as an accomplishment, subsequently devote their leisure to its pursuit; but it is also executed by those who follow it as a profession. The remarks which have been already made respecting the productions of two of the French Exhibitors may with equal truth be repeated here in regard of the contributions of the MINTORNS and MRS. STRICKLAND. In their productions even the minutest details of the plants are represented with microscopic truthfulness; and in all there is evinced an amount of careful and patient study deserving of the highest praise. In respect also of the examples displayed by the other Exhibitors, it is not too much to say that there are but few which could be said to possess only an ordinary degree of merit.

In the making of Cambric-flowers the aim of the British artists has not been so high, and although meritorious commercial articles are rewarded, still the generality of the contributions are below those of the same species in the French Department. At present a large quantity of the better description of cambric-flowers is imported annually into the United Kingdom. In 1850, for example, the imports amounted in value to 61,634*l.*, and 15,409*l.* were paid for the duty upon them.

Shell-flowers, Wax-fruit, and, lastly, Feather-flowers, find a place in the British contributions to Class XXIX.

WURTEMBERG.

The contributions from Wurtemburg, which are creditable, are from Two Exhibitors, one of whom sends materials for flower-making, and the other finished flowers made of cambric.

There are Seventy-four Exhibitors of artificial flowers and fruit; of these there are—

- | | |
|----|----------------------------------|
| 1 | Holder of a Council Medal. |
| 16 | Holders of a Prize Medal. |
| 10 | Who obtained Honourable Mention. |
| 47 | Unrewarded. |
| — | |
| 74 | |
| — | |

The classification according to the various countries is as follows :—

Austria	-	-	-	-	2	France	-	-	-	-	13
Brazil	-	-	-	-	1	Hamburg	-	-	-	-	1
British Colonies and Channel Islands :—						Hesse	-	-	-	-	1
Bahamas	-	-	-	-	2	Mexico	-	-	-	-	1
Barbadoes	-	-	-	-	3	Nassau	-	-	-	-	1
Guernsey	-	-	-	-	1	Portugal (3), and Madcira (1)	-	-	-	-	4
India	-	-	-	-	1	Sweden	-	-	-	-	1
Jamaica	-	-	-	-	1	United Kingdom	-	-	-	-	34
Malta	-	-	-	-	1	Wurtemberg	-	-	-	-	2
Mauritius	-	-	-	-	2	Total	-	-	-	-	74
— 11											

The Seventy-four Exhibitors admit also of classification according to the nature of the articles which they have contributed, in the following arrangement :—19 Exhibitors of Wax-flowers ; 14 of Wax-fruit ; 6 of Materials for Cambrie-flowers ; 17 of Cambrie-flowers ; 1 Exhibitor of Crape Mourning-flowers ; 5 Exhibitors of Feather-flowers ; 5 of Shell-flowers ; 6 of flowers of other materials, as Braid, Rice-paper, Palm-leaves, Spun-glass, and Bends ; and 1 Exhibitor of flowers, for Table-decorations, cut out of turnips.

LIST OF AWARDS.

ADAMSON, O. G., Pantou Street, London (Brazil, No. 1). Prize Medal, for a very large and elaborate group of Brazilian flowers, executed in Feathers obtained from the plumage of Brazilian birds. It exhibits wonderful brilliancy of colour, and much accuracy of form. The mechanical execution is very good, and much taste has been displayed in the arrangement of the bouquet.

BRETEAU, C., Paris (France, No. 1112). Honourable Mention, for Artificial Flowers, Plumes, &c. These decorative articles are of good quality, and well designed.

BURGER, J., Vienna (Austria, No. 700). Honourable Mention, for a collection of Miniature Artificial-Flowers. This collection is chiefly noticed as containing examples of a manufacture which is carried on rather extensively in Catholic Germany. The specimens do not possess any high artistic merit, since they are cheap products for commercial purposes.

CHAGOT, A., sen., Paris (France, No. 1139). Prize Medal, for Feathers, Bouquets, Artificial Flowers, and Vases. Manufactures of a more common class than most of the other collections, and intended to supply large consumers and the export market, for which they are good and well executed. The colours and grouping, as is usual in French articles, are of a superior character.

CHISHOLME, EMMA, Edward Street (Class XXIX., No. 78). Honourable Mention, for Wax-flowers botanically accurate, especially a group of *Orehidaceæ* ; a Rose-tree is also executed with much skill. This is, on the whole, a very creditable collection.

CONSTANTIN, J. MARQUES, Paris, and Regent Street, London (France, No. 94). Council Medal, for a large case in the Area of the East Nave, and a case in the South-East Gallery. The productions of this maker are of the very highest quality, and the imitations of entire plants in the large case display not only great

skill in construction, but so intimate a knowledge of their botanical character as to render them available for purposes of instruction as well as decoration. The material of which they are made is chiefly cambric, with which the imitation of texture is most successful. For general truth and natural character, especial attention may be drawn to the Prince's-feather, Sun-flower, *Aristolochia*, and other plants of intricate conformation, which are productions of the first order in this class of objects. Most deserving of commendation, also, is the admirable skill with which are portrayed the several stages in the development of plants, from the budding blossom to the decaying flower, from the opening leaflet to the fallen and withering foliage: even accidental fractures are delineated with surprising truthfulness. The case in the Gallery contains a collection of Flowers, Wreaths, Bouquets, &c., of similar construction, but of less elaborate work, and more adapted for general purposes. These flowers are not only characterised by the same kind of excellences as the others, but in their manufacture a solidity and durability of high importance have been secured. (See *Prefatory Remarks*, p. 1335.)

DORVELL, ELIZABETH, Oxford Street (Class XXIX., No. 77). Prize Medal, for Wax-flowers. The groups in this collection are most exquisite, from the tasteful selection of subjects and the arrangement of colours. The flowers are well made and very accurate. The model of the *Victoria Regia* is also good.

EWART, HENRIETTA, Bath Place, New Road (Class XXIX., No. 75). Honourable Mention, for Wax-flowers, deserving of commendation for the good selection and arrangement of the subjects of the groups, also for their mechanical execution and botanical accuracy.

FISHER, JOSEPH, Cripplegate Buildings (Class XXIX., No. 80). Honourable Mention, for imitation Flowers in pots, &c. These articles are intended for decorations on a large scale, for rooms, &c., and, therefore, are of a somewhat rougher character than those intended for personal ornaments. There is a degree of stiffness about them, but they are, on the whole, very creditable; more particularly the Fuchsias.

FLORIMOND, —, Paris (France, No. 1224). Honourable Mention, for Artificial Flowers, &c. Artificial Flowers as applied to Head-dresses; Fruits and Flowers. These, though not of the highest class, are deserving of praise for the taste displayed in the grouping.

FOSTER, SON, and DUNCUM, Wigmore Street (Class XXIX., No. 74). Prize Medal, for articles used in the manufacture of Artificial Flowers, Feathers, &c. The materials are good, and brilliantly coloured. Interesting specimens of unfinished flowers are exhibited, illustrating the mode of manufacture. The finished flowers, as well as the feathers, &c., are very beautiful articles, taking a high place among the commercial productions of this class.

FURSTENHOFF, EMMA, Paris (France, No. 492A). Prize Medal, for Artificial Flowers, manufactured from muslin and crape, to facilitate the study of botany. There is much merit in this collection, but this depends chiefly upon their beauty and fitness for ornamental purposes; since, although botanically accurate, the examples are chiefly of double and cultivated flowers, which are of inferior value for the purpose mentioned by the Exhibitor.

GATTI, A. and G., Coppice Row, Clerkenwell (Class XXIX., No. 73). Honourable Mention, for Artificial Flowers, and articles used in their manufacture, such

as leaves, buds, and other components of flowers; chiefly of common material, but very good in regard to colour, some of the tints being exceedingly bright and rich. The flowers are extremely accurate in their imitation of Nature, and are mostly well selected for the peculiar class of article. As cheap commercial productions, this collection deserves commendation.

GAUDET-DU-FRESNE, Paris (France, No. 842). Prize Medal, for manufactured leaves for artificial flowers. This collection contains a large assortment of leaves, executed in a peculiar manner; and though restricted to a special branch of the manufacture, is remarkable for the variety and beauty of the specimens, which exhibit a very fair amount of natural character.

HARAND, E., Paris (France, No. 863). Prize Medal, for Head-dresses, Trimmings, &c. These are very good commercial articles, suited for superior markets, and exhibiting great taste and accuracy in design.

LEFORT, —, sen., Paris (France, No. 1295). Prize Medal, for materials for Artificial Flowers. This maker has produced Papers and Stuffs of most brilliant colours, and in very perfect series of gradations of tint; the paper stained with carthamus-red (safflower) is especially remarkable for the purity and vividness of its colour. These, as well as the more advanced forms of the "materials," such as Leaves, Sprigs, Buds, Berries, or other Fruits, for the construction of bouquets and wreaths, are excellent specimens of a class of manufacture carried on upon a large scale for the supply of a cheap market.

LUMSDEN, J., Trevor Terrace, Knightsbridge (Class XXX., No. 125). Prize Medal for Wax-flowers. An exceedingly graceful and truthful group, executed with much skill and artistic feeling. The colours are chosen with excellent taste, and the effect of the whole is very beautiful.

MAKEPEACE, ELIZA, Manor Place, Clapham (Class XXX., No. 185). Honourable Mention, for Wax-flowers, distinguished by the accurate representation of Nature, and the delicacy and beauty of the colouring. They are exceedingly well adapted for scientific illustration.

MINTORN, JOHN H., HORATIO, ELIZABETH, and REBECCA, Soho Square (Class XXIX., No. 70). Prize Medal, for a very large and beautiful collection of Wax-flowers. The plants in the large case are very accurate and life-like, and well adapted for scientific Museums, to which they are especially suited from the truthfulness with which they represent the botanical characters of the various plants. The *Victoria Regia*; the Ferns showing all their minute fructification; the Mignonette; and the Orchids, are among the numerous instances deserving of the highest praise. The small groups and single flowers are also very elaborate imitations of Nature, and present a beautiful appearance; the colouring, texture, and mechanical finish being of the first class.

PAROISSIEN, A., Paris (France, No. 945). Honourable Mention, for a collection of Waxed Leaves, prepared with considerable attention to accuracy in the imitation of nature.

PERROT, PETIT, and Co., Paris (France, No. 952). Prize Medal, for Artificial Flowers, Feathers, &c. Bouquets and Wreaths, composed of various materials; the Feather-flowers are very beautiful; and the whole collection, including the Feather-ornaments, is very excellent, and affords an evidence of much taste on the part of these Exhibitors, whose productions hold a high rank in the French Department.

RANDOLPH, WILHELMINA, Marsham Street (Class XXIX., No. 66). Prize Medal, for plants imitated in Undyed-feathers. This collection displays much ingenuity and industry. The field to which the maker has restricted herself is somewhat narrow, probably from the difficulty of obtaining brilliantly-coloured feathers; but so far as her attempt extends, she has succeeded remarkably well in representing the natural characters both of flowers and foliage. The Roses, Carnations, and Wall-flowers are highly creditable.

RUSSEL, VINCENTE, Lisbon (Portugal, No. 1298). Honourable Mention, for an Artificial Orange-tree. A very creditable imitation of a small orange-tree, distinguished by more than common truth of general character.

SANTA CLARA (Funchal), THE NUNNERY OF (Portugal). Prize Medal, for a case of Feather-flowers from Madeira, in the Portuguese Department. A very beautiful specimen of this manufacture, which is extensively pursued in Madeira.

STRICKLAND, MARIA, New Bond Street (Class XXIX., No. 63). Prize Medal, for a collection of Wax-flowers. The flowers of this collection deserve the highest praise for their artistic merits. They are exceedingly accurate in form, colour, and texture; in which latter respect a group of Roses may be especially noticed, an uncommon amount of delicacy having been attained in the petals. A bunch of Heaths is equally good. The Model of the *Victoria Regia*, in its various stages of development, is excellent and most life-like.

SUGDEN, BORRAS, and Co., Aldermanbury (Class XXIX., No. 62). Prize Medal, for Artificial Flowers, Feathers, and Head-dresses. The flowers in this collection are especially worthy of notice, as being very superior commercial products for general use. Much ingenuity is displayed in the imitation of textures by various materials, such as Waxed-cloth, Velvet, Muslin, Cambric, &c., and for general accuracy of form and colour, brilliancy of tint, and tasteful selection of subject, they merit strong praise. The Feathers are also exceedingly good.

TILMAN, —, Paris (France, No. 698). Prize Medal, for Artificial Flowers, Head-dresses, &c.; small Groups, Bouquets, &c., in great variety, of very superior quality, as intended for general commercial purposes, combining a fair amount of natural character with good mechanical execution, and much taste in the selection and grouping of the component leaves and flowers. The collection of this Exhibitor is one of the best contributed by the French flower-makers.

II.—TAXIDERMY.

The art of stuffing animals is generally supposed to be an invention of modern date, and to have originated about the period when the various museums of Natural History were founded in Europe; but traces of the art are to be discovered in the earliest records of antiquity, although the methods then employed differ much from those now practised. The proceduro of the ancient Egyptians in embalming human remains and dead animals, in some measure resembles the manipulations of the taxidermist; inasmuch as in both the parts peculiarly subject to decomposition are removed, and replaced by more durable materials. But whilst the Egyptian embalmer desired rather to preserve the substance of the body than its form, the taxidermist sacrifices all, except the skin, to the obtaining of a natural representation of the aspect of the living animal. The ancient Greeks and Romans, however, endeavoured to pre-

serve the form as well as the substance of the body, but their methods fulfilled the object very imperfectly. The ordinary proceeding consisted in immersion in melted wax, or in honey: this necessarily disguised the shape, even though it remained unimpaired. Perhaps the best of the ancient methods for the preservation of animal substances consisted in placing them in a solution of common salt; this is still done, though for very different purposes. In this manner the sow, which by bringing forth a litter of thirty pigs, afforded a happy omen to Æneas, was preserved by the priests; and it kept so well that it was said to have been in existence at Lavinium in the time of Varro. In the same way were preserved two hippocentaurs (probably monstrous births), and also an ape, which, having been sent by the Indians to the Emperor Constantius, happened to die on the road.

It appears to have been the business of the priests to preserve rare animals, or rare natural specimens generally, and this was so prevalent, that we are almost tempted to refer the origin of museums of Natural History to the temples of antiquity; indeed Beckmann, in his *History of Inventions*, quotes a number of instances which support this view. And although it cannot be positively* asserted, from the notices in the Greek and Latin authors on the subject under review, that methods resembling those now used by the animal-stuffer were employed by the ancients, still the circumstance that animals were frequently suspended in the temples, shows that they were not invariably preserved in salt or honey. The ancients, must consequently have possessed methods of preserving animal substances in the dry state; but they appear to have been ill adapted to the purpose, for the head of the celebrated Calydonian boar, which Pausanias saw in one of the temples of Greece, had evidently suffered by time, or the ravages of insects, and had lost the greater part of its bristles.

The art of preserving animals appears to have been but little, if at all, practised during the middle ages; for we only now and then meet with a notice of natural objects being kept as curiosities in the treasures of emperors, kings, and princes. It is only in the records of the period when the study of natural science was resuscitated that passages are to be met with indicative of a knowledge of taxidermy. Sportsmen had undoubtedly practised it much earlier, in a rough manner,† for the purpose of making effigies of call-birds, in the absence of the living

* In one of the *Epistles* of Horace (*Epist. lib. I., Epist. 2, l. 65*), addressed to Lollius, a passage is met with, which has been generally construed into a knowledge of Taxidermy among the ancients. The words are:—

Venaticus, ex quo
Tempore cervinam pellem latravit in aula,
Militat in silvis catulus.

Many interpret *pellis cervina* as a stuffed stag, placed in the hall, and barked at by the dog. This explanation assumes that the ancients decorated their halls in such manner, like a modern hunting-box. The passage is, however, intelligible if we translate *pellis cervina* as the mere skin of the stag.

† Although the foregoing sketch suffices to show that the art of taxidermy can only have been very gradually developed, still it will not be inappropriate to introduce in this place the often-told, but improbable, anecdote of a rich gentleman of London named Lever, who is said to have possessed a valuable collection of living birds. These all died in one night, owing to the stove used in the aviary having cracked, and the vapours suffocating them. The intensity of Mr. Lever's grief at the loss of his favourites induced him to make an effort at preserving

bird, while they imitated the note of the bird with their own voice, or some artificial contrivance.

The first records of collections of objects of natural history relate to the second half of the sixteenth century, and it appears from them that such museums existed chiefly in Italy; in relation to which the name of Francesco Calceolari deserves especial mention (Verona 1584). These collections, which were commenced by private individuals from purely scientific motives, increased in number and importance in the seventeenth century. This period gave birth to the collection of the Tradescants (father and son), which was purchased in 1659, by Elias Ashmole, who presented it in 1683 to the University of Oxford, and thus founded the Ashmolean Museum; and also to the collection of James Petiver, which was much enriched by Sir Hans Sloane, and, on the death of this distinguished naturalist, became the nucleus of the British Museum. It is from this epoch, in which the majority of continental collections took their origin, that the art of preserving skins must be dated; and from the moment it became subservient to science, it kept pace with the growth and requirements of these institutions.

It is a point of extreme interest to compare the admirable productions in taxidermy contributed to the Great Exhibition, with the old specimens of the art of animal-stuffing to be met with here and there in the museums of natural history. Nothing more dissimilar can be imagined; for while the successful productions of modern times present Nature to our eyes, and show that the artist has closely studied her hidden secrets, the animals of the old stuffers resemble anything but that which they are intended to represent. It would appear that the study of nature was not deemed to be essential, and that imagination took its place, and was allowed great latitude in the putting-up of the stuffed effigies; so much so, that the living prototype would have recoiled in horror from the contemplation of its defunct representative.

The older taxidermists had, evidently, to direct their entire attention to overcoming the difficulties presented by the material, the preservation of which was the main point. At first they contented themselves with removing the intestines and the brain, especially in birds; they attempted to prevent the putrefaction in the remaining parts, by exposing the bodies to a gradually increasing temperature for the purpose of expelling all the water. But however carefully the drying was attended to, it is evident that these productions were of an ephemeral character, as they presented a tempting bait to many descriptions of insects. An improvement was next effected by removing the large fleshy muscles, the entire skeleton still remaining. At present, the skin alone is employed; all parts that rapidly undergo putrefaction being carefully removed. By this means, and by the aid of modern chemistry, which has yielded a series of useful preparations to the taxidermist, the putrefaction of the stuffed animals was prevented. The operator was consequently enabled to direct his attention to other points of great importance; and from the moment he was freed from anxiety respecting the preservation of his subject, he

their dead bodies, and he is said to have succeeded in this by the aid of his physician, who invented animal-stuffing for the occasion. These birds are reported to have given rise to the Leverian Museum, specimens from which may yet be met with in the British Museum.

strove to perfect his mode of representing nature, and thus completely altered the range of his art. The skin of the animal has now become, in the hands of the taxidermist, a crude material to be endowed with form, and life-like attributes, as the marble under the chisel and mallet of the sculptor; and unless, like him, he prepares his mind by anatomical studies, and a close observation of nature, he will surely fail to realise a satisfactory production. The Works of Art exhibited—for to many of the specimens the term may be well applied—prove that animal-stuffing has been cultivated with unequivocal success in this direction.

UNITED STATES OF AMERICA.

The Exhibitors are Two in number, one of whom sends a Black-eyed Squirrel, and the other a case of Animals, Birds, and Fishes; but neither of these contributions calls for especial notice.

BELGIUM.

The contribution which comprises a case of Stuffed-birds indigenous to Belgium, and also a case of Stuffed Foreign Birds, requires no especial notice.

BRITISH COLONIES.

British Guiana.—Mr. A. F. RIDGWAY exhibits a case of stuffed birds, comprising:—the Toucan, Blue Parrot from Essequibo, and the Yellow-bellied Trojan. *Nova Scotia*.—Mr. A. DOWNS contributes some well-prepared specimens of Birds from that colony. *New Zealand* sends specimens of Insects. *South Africa*.—Captain FADBY, R.A., exhibits specimens of the Hartebeest, the Striped Koodoo, and the Waterboc, from the Cape of Good Hope. The manner in which these have been preserved and set up cannot be commended; but it is alleged that the two last-named animals are the first of their kind that have reached this country: and if so, they are of interest. *Van Diemen's Land*.—Mr. F. COX exhibits a case of Tasmanian Insects; and Mr. BONNEY, one of Tasmanian Birds; which are interesting specimens. Mr. W. H. INCE, of Chelsea, exhibits a case of Birds formerly belonging to the late Captain J. M. R. Ince, who died at Hong-Kong whilst commanding Her Majesty's ship "Pilot." They formed part of the rare and interesting specimens of Natural History collected by that officer when Lieutenant of H. M. S. "Fly," during the survey of the Great Barrier Reef and Coasts of Australia. These specimens are of great interest, not only from their number (Forty-two) and the beauty of the examples, but also from the evidence they afford of the cultivation of science by the officers of the British Navy. *Western Africa*.—Her GRACE THE DUCHESS OF SUTHERLAND exhibits a case of Birds from the river Niger.

FRANCE.

It is much to be regretted that no contribution has come from France. The attention and the chemical and scientific research bestowed upon this art by

French naturalists,—Béccour of Metz, the inventor of the metallic-soap;* Fontenelle, Dufresne, and others, and the value of their writings, is well known to naturalists; and it would have been interesting to compare the present condition of the art in that country, with the progress which has been made elsewhere.

SARDINIA.

The only contribution is an Elk from the Zoological Museum at Turin. This specimen is most remarkable. It exhibits to perfection the art of representing the living animal, not only in its general form and character, but marking also the fine and delicate undulations of the flesh and muscles, and all the anatomical details which are externally traceable. The difficulty of effecting this is so great that generally it is scarcely attempted; but in the present instance the artist has been most successful. The process adopted by Sig. COMBA, the Exhibitor of this specimen, has been that of modelling the animal in clay, and from that model forming a mould; this mould enabled him to construct a figure of a material resembling papier-maché, retaining all the fidelity of the original model; upon this figure the skin is stretched.

UNITED KINGDOM.

The number of British Exhibitors is Thirteen. Of these the following deserve especial notice. A. D. BARTLETT exhibits an ingenious example of the art in the constructed figure of the Dodo—a bird which was once a native of Mauritius, and found there in considerable numbers at the beginning of the last century—but now, as far as is known, entirely extinct. The drawings of Savery, preserved in the Belvedere at Vienna, and in the Royal Gallery at Berlin, and some remains of a skeleton formerly in the collection already alluded to, of Elias Ashmole, consisting now but of the head and one foot—are the data from which the figure has been compiled. The process is of course very different from that of preserving a real animal, the skeleton and skin of which are entire: an artificial body has to be constructed, and then covered, feather by feather, with such plumage as is most in accordance with our knowledge of the bird. This has been very skilfully executed; and the result, by the testimony of Mr. Strickland, and of Mr. Gray of the British Museum, "represents with great accuracy the form, dimensions, and the colour of the Dodo, as far as these characteristics can be ascertained from the

* BÉCCOUR'S ARSENICAL SOAP.

Camphor	-	-	-	-	-	-	5 ounces.
Arsenic (<i>arsenious acid</i>), in powder	-	-	-	-	-	-	2 pounds.
Curd soap	-	-	-	-	-	-	2 pounds.
Salts of tartar (<i>carbonate of potash</i>)	-	-	-	-	-	-	12 ounces.
Lime, in powder	-	-	-	-	-	-	4 ounces.

The soap is first cut in small slices, and melted gradually with water over a slow fire, stirring all the time. When melted, the salts of tartar and lime are added and well mixed. The mass is then taken from the fire, and the arsenic triturated with it in a mortar; and, lastly, the camphor is added, after having been separately triturated to powder with the aid of a little spirit of wine. The mixture has the consistence of stiff flour-paste.—*The Art of Taxidermy*, by Peter Boswell, p. 2.

evidences which exist," whilst it "does great credit to Mr. Bartlett's skill, and to his practical acquaintance with the structure of birds."

There are other specimens exhibited by Mr. Bartlett which are, perhaps, more attractive, inasmuch as they represent nature with a fidelity of which all can judge. The pair of Impeyan Pheasants, entitled "*Courtship*," and the Sleeping Orang-outang, "*Repose*," are especially deserving of notice. The fleshy parts of the latter have been very skilfully treated, and the dried and shrivelled appearance which they so often assume is entirely avoided.

The skeleton of the Orang-outang has been preserved, and also the viscera; the whole furnishing an example of the manner in which rare specimens should be dealt with, in order to secure accurate information to the naturalist, and to promote the advancement of science.

J. A. HANCOCK, of Newcastle, exhibits, in the North Transept, some beautiful examples, not only of a faithful and spirited adherence to life and nature, but of a skilful and harmonious combination of forms and colours. The three illustrations of Hawking, and the scene in the Tropics, will go far towards raising the art of Taxidermy to a level with other arts which have hitherto held higher pretensions. The first of the three objects, illustrating the ancient sport of Falconry, is the Hooded Hawk, looking lean and hungry, with the strap attached to his leg, by which he is held on the falconer's fist. In the second group, the Falcon has struck to the ground, and is in combat with the *Quarry*, a powerful Heron, who is struggling in vain against the attacks of his enemy; whilst the Eel, which but for the interposition of the Hawk would have been soon devoured by the Heron, is quietly making his escape. The third tableau exhibits the gorged Falcon; what a contrast is here presented! the blood-thirsty enemy of the Heron is scarcely to be recognised in the drowsy figure: standing on one foot, the other being drawn up under his breast—the eye half closed: he is the very image of gluttony. The tropical group comprises Cockatoos and Parrots disporting in a rich tropical vegetation, glittering (perhaps too much so) with brilliant Butterflies and Beetles, Lizards, and other Reptiles. The stolid, heavy, self-satisfied expression of the parrots is well brought out by comparison with the anxiety and trepidation of the Mate of the Dead Gull in another group; or with the restless gaze of the Lämmergeyer of the Alps. The contrast between Life and Death is also well kept up, by the display of a group of Dead Game, the ruffled state of the feathers being exceedingly truthful.

C. GORDON exhibits a representation of an Owl "mobbed by small birds," in which the action of the owl and of his tormentors is given with great liveliness and fidelity.

Dr. BEEVOR, of Newark, exhibits a Dog prepared much in the same way as the Elk contributed from Sardinia, and although not included in the Awards hereafter to be enumerated, it is deserving of favourable notice.

J. LEADREATER exhibits a curious and instructive collection of Indian Gallinaceous birds; and an extensive collection of Humming-birds, comprising about 300 or 400 varieties, in the North Transept, which are very carefully set up.

T. M. WILLIAMS and J. GARDNER exhibit a brilliant assemblage of richly plumaged Birds from various parts of the world. The productions of these artists are apparently of a class rather for the drawing-room than the cabinet of the

naturalist. They have selected chiefly those denizens of the air most distinguished for the brilliant colouring of their plumage. So far as the careful preservation of the plumage is concerned, they deserve commendation, but in respect to a delineation of the habits of the birds by appropriate scenery, they fall short of the excellencies attainable in this art.

WURTEMBERG.

The collection of H. PLOUCQUET consists of, 1st. A series of scenes taken from Kaulbach's illustrations of the well-known German story of Reynard the Fox (*Reineke Fuchs*), and executed with great skill. In these the Exhibitor does not of course claim the merit of conception; but the humour with which the design of the artist is carried out, and the expression thrown not only into the attitude, but into the countenance of each animal, is admirable.

2nd. Groups of Birds and small animals in action, designed as well as executed by the Exhibitor. Some of these also are humorous, and show considerable ingenuity, as, for instance:—a Love-scene illustrated by Weasels; a Parting-scene between a Cat and a Polecat; a Literary Polecat, &c. Others represent the movements or habits of birds in the care of their nests or of their young; the appearance of the broods at different ages; and the action of the parent birds in defending them against attacks of other animals. All are remarkable for spirited and life-like execution.

3rd. The representation of two large Hunting scenes, such as form the subjects of Snyder's pictures. One, an attack of Dogs upon a Wild Boar; the other, a Stag pulled down by Hounds. These evince great spirit, and a close study of nature; although in one or two instances the action of the limbs and muscles are not minutely correct. These inaccuracies, however, are so few and so slight, that they cannot detract from the very great merit which belongs to the whole of M. Ploucquet's exhibition. The process employed by M. Ploucquet in preparing some of his smaller specimens has been to mould the figure of the animal in plaster-of-Paris, and to stretch the skin upon the model; and it has been most successful. The groups of M. Ploucquet attract by far the largest share of public attention.

There are Twenty-six Exhibitors of Taxidermy, of these there are:—

4	Holders of a Prize Medal.
1	Who obtained Honourable Mention.
21	Unrewarded.
—	—
26	Total.

The classification according to the various countries is as follows:—

America, United States of	2	Van Diemen's Land	-	-	-	3
Belgium - - - - -	1	West Africa - - - - -	-	-	-	1
British Colonies:—		Sardinia - - - - -	-	-	-	1
British Guiana - - -	1	United Kingdom - - -	-	-	-	13
Nova Scotia - - - -	1	Wurtemberg - - - - -	-	-	-	1
New Zealand - - - -	1					—
South Africa - - - -	1	Total - - - - -	-	-	-	26
	— 7					—

LIST OF AWARDS.

BARTLETT, A. D., Great College Street, Camden Town (Class XXIX., No. 291). Prize Medal, for a model of the Dodo, and several excellent examples in the higher branches of Taxidermy.

COMBA, F., Turin (Sardinia, No. 83). Prize Medal, for a Stuffed Elk, exquisitely modelled.

GORDON, C., Museum, Dover (Class XXIX., No. 202). Honourable Mention, for a group of Stuffed British Birds.

HANCOCK, J., Newcastle (Class XXIX., No. 320). Prize Medal, for several single specimens and groups of Stuffed Birds and Animals, most truthful as to the representation of the habits and appearance of these creatures; and in every respect of the highest merit.

PLOUQUET, H., Stuttgart (Wurtemberg, No. 107). Prize Medal, for several humorous groups of Stuffed Animals; Groups illustrative of the habits of birds, and two large Hunting-pieces.

C.—ARTICLES CONNECTED WITH EDUCATION.

I.—EDUCATIONAL MODELS.

There is perhaps no subject more deserving of the attention of enlightened persons, nor any means more conducive to the intellectual and physical advancement of a people, than the dissemination of *accurate* practical knowledge among all its classes; and it is one of the most gratifying circumstances of the present age to find many philanthropic individuals endeavouring to smooth the path to knowledge, for those whose position in society does not permit of their engaging in a long course of study.

Beyond the mere rudiments of education, no branch of learning is more valuable to the working-classes than applied Physics and Mechanics; and in those departments there are no means better calculated to impress the mind of the student with the great unchangeable laws of nature, and with the construction of the mechanical contrivances by which man renders them available for his wants, than Working-Models. Under ordinary circumstances, however, these useful aids are unobtainable by the majority of students, on account of their expense. In order to remove as far as possible this impediment, EDWARD COWPER, Professor of Manufacturing-Art and Machinery at King's College, London, has contrived a series of *cheap* models to illustrate his courses of lectures, with the view of stimulating his students to imitate them, in consequence of their extreme simplicity. Finding that they fully answered their intended purpose, he has since allowed them to be copied by the Society for the Promotion of Christian Knowledge, for the purpose of their introduction into National-schools. The Society is thus enabled to supply them at a few pence only above their prime cost; and at the same time it also furnishes pamphlets explanatory of the various parts of each model and their functions, so that the teacher may readily acquire and easily impart a knowledge of the subject they are intended to illustrate. For example, a Sectional-Model of "the Working-parts of a Steam-engine," 20 inches by 10 inches, is furnished for 7s. 6d. All the parts are moveable, and the name of

each is indicated by a printed label pasted on it; as cylinder, piston, piston-rod, connecting-rod, crank, fly-wheel, valve-box, slide-valve, steam going *into* the cylinder, steam going *out* of the cylinder, &c. It would be impossible to estimate how many of the millions of visitors to the Great Exhibition there are who would be thankful for the information obtainable in the North-East Gallery from this and similar rough but valuable models.

Besides the model of a steam-engine, the following are also exhibited:—an Orrery, or Stellarium, price 10s., showing the revolutions of the earth round the sun, and of the moon round the earth; also the rotation of the earth on its axis, the inclination of the axis to the orbit, illustrating the cause of the seasons; and the inclination of the orbit of the moon to that of the earth. A Working-section of a Pump, 24 inches by 10 inches, price 7s. 6d.; a six-inch Sphere for showing the phases of the moon, 2s.; a box of Cubes, Bricks, &c., for teaching Tangible Arithmetic, 8s. 6d.; a series of Measuring-rods, of 1 foot, 2 feet, and 6 feet in length, at 2d., 4d., and 6d. each; specimens of Levers, also a Scale-beam and Steel-yard, 3d. each; a Loom for weaving tapes, garters, &c., 7s. 6d.; a Door-lock, 20 inches square, 7s. 6d. The only Exhibitor of Educational Models which have come under the consideration of this Jury is

Prof. EDWARD COWPER, Kensington Park Villas (Class XXIX., No. 245), to whom a Prize Medal is awarded.

II.—ETHNOGRAPHICAL MODELS.

Under this title will be described a few collections of small Figures, illustrative of foreign costumes and manners, which have come under the notice of the Jury of Class XXIX., although they were arranged as belonging to Class XXX. These, apart from their excellence as works of art, possess a very high interest, as conveying, through the eye, a vivid representation of the customs, occupations, and habits of the natives of distant countries, not so easily apprehended from any written description, however well illustrated by drawings. These models are confined to the Court of the Fine-Arts, with the Maltese, the Indian, and the Spanish Courts. Those contained in the first-named department attract by far the largest share of public attention; although, in respect of the particular excellence which is here contemplated, they possess, perhaps, less interest than the very diversified and most extensive series in the Indian Court. It is to be feared that this latter collection will be dispersed, with the other splendid contents of the Department, before its value can be fully appreciated.

UNITED KINGDOM.

The Fine-Art Court contains a collection of very beautiful, life-like, and spirited Figures, modelled in wax with most surprising minuteness and artistic feeling, both in the position and grouping. They represent the natives of Mexico, and also the American Indians, habited in their proper costume, and displaying their characteristic customs in the several phases of civilized and savage life, with a truthfulness in the varied expressions and anatomical development of the different effigies, which is most remarkable. An Indian rejoicing in triumph over the despair of a white victim, whom he has bound and is about to scalp, but whose sufferings he is prolonging with savage cruelty, may be especially cited in illustra-

tion of this particular excellence; and the group of three figures, entitled "a Confessional," as an instance displaying a rich vein of humour. The "*Aquador*," or water-carrier; the "*Remendor*," or street-cobbler, in his tattered garments; the group of civilized Indians laden with produce; the group of savage Indians, called "*Mecos*;" the *Fandango*, a national dance, illustrated by two Indian women dancing to the guitar, played by a male figure, with numerous other examples which might be adduced, are also all deserving of equal praise.

INDIA.

The Figures in the Indian Courts, which have, it appears, been contributed by several Exhibitors, are either modelled in clay or plaster, or else carved in wood, and painted to represent the natural colours of the various objects. The largest group, which was contributed by Mr. MANSFIELD, of the East India Company's civil service, is contained in a model of the "*Jamma Bundi*," or the encampment of a Government collector, whilst moving about on his annual tour through his district. The figures are of plaster, and the buildings of wood. The double-poled tent of the Collector is pitched at a short distance from the village; and he is represented as sitting within it, surrounded by the "*Manletdar*," and other revenue officers. Several petitioners are congregated around the door of the tent, soliciting a remission of part of the payments due from them. The figures of men and animals are about Three hundred in number, and present a lively representation of Indian life and character. Some are indolently lying under the trees, some are gazing at the performance of a snake-charmer, and some feeding an elephant; whilst others, more intent on the business of the day, are having their petitions written out by the village accountants, or "*Coolkurnees*." The village, near which the encampment is formed, is represented inside a fortified wall, which surrounds it, and which is shown in section. There are also to be seen the numerous shops and rows of houses in the village, with the inhabitants engaged in their various pursuits.

The best executed and most instructive models, however, are those of clay, manufactured in Kishnaghur, representing the various castes and professions of the Hindoos, which collection comprises upwards of Sixty illustrations, some consisting of several figures. Here, almost in the closest juxtaposition with the splendid cotton carding, spinning, and weaving machinery exhibited in Class VI., there is to be seen a Bengal woman cleaning cotton with the strung bow, and another spinning with the most primitive of apparatus; and the Weaver preparing his thread on his roughly-made loom. Not far from Nasmyth's steam-hammer, the "*Khamar*," or Bengal blacksmith, is represented with his simple bellows, forge, and anvil; and within a very short distance from the latest refinements in agricultural implements and machinery, are illustrations of Ploughing and Harrowing with apparatus which no European could use; and Rice-grinding that must require all the patience of an Indian to perform. On a line with the locomotive-engines which convey our correspondence with a celerity not dreamed of a few years since, and even now insignificant in comparison with the lightning speed of the electric telegraph, are effigies of the *Dawk-runner*, or Bearer of the Government Mail-bags; and the *Dawk-bandy-burdar*, or Messenger who carries Post-office Parcels; and, closely watched by the unarmed policemen, are the

Bro-jobassee, or armed watchman, and the *Chowkeedar*, or village watchman. These are only a few of the groups of this most suggestive and well-executed collection. It will recompense the most attentive study; and the visitor cannot fail to be astonished at the very simple implements used by the Hindoos to effect operations for which costly and ponderous machinery are generally employed with us. An instance, in addition to those already cited, may be pointed out in the primitive pair of wooden cylinders for crushing the sugar-cane, which are turned by a single individual with a cross-handle, whilst two others are engaged, the one in feeding the machine, and the other in taking away the juice and the crushed cane. This simple machine, although not comparable with the gigantic three-roller crushing-mill with its attached steam-engine, seen in Class VI., nevertheless shows that the Indians were acquainted with the principles involved in its construction.

Less perfect in point of execution than the Kishnagur clay figures, but still most interesting, are the Models manufactured at Gokak; which it appears are not made as articles of export, but only to order. This collection comprises about forty illustrations, out of which may be especially noticed, as representing trades, the Cotton-printer, the Potter, the Woman grinding meal, the Bengal Water-carrier, or *Bheestee*, and the Washerwoman, or *Dhobie*.

The Models illustrating the practices of the Thug murderers excite the most painful interest, and represent the following incidents:—A traveller, induced to sit down and smoke, has his attention directed to the heavens, when the fatal handkerchief is applied by a Thug who stands behind him; but in another group a horseman is successfully defending himself from an attack on the part of the Thugs, one of whom he has slain. The mutilation of the bodies of the murdered, and their concealment in a well, and the strangling of travellers on horseback and on foot, are also represented. It is stated that some of these Thug murderers, after having been arrested and reclaimed, and domiciled in a school of industry, were the manufacturers of the carpets exhibited in the Indian tent.

The other Models contained in the Indian Court comprise Thirty-five Figures in wood, from the Rajah of Jodhpore; a model of a European court of justice, and also one of a Native court; models of a Silk-factory and an Indigo-factory, of a native Oil-mill, and of a Farm-establishment. A series of male and female figures, exhibited by T. E. J. BOILEAU, represent the principal Sects in Cochin China and Travancore.

MALTA.

The Figures from Malta, which are modelled in wax, have not the same claims to merit as those before described, but have still a certain amount of excellence. They represent the Grand-Master Valetta, the Grand-Master Lonzadari, with the Master of the Order of Malta, and a Knight, in their proper costume.

SPAIN.

Three Exhibitors contribute models illustrative of the manners and dresses of Spain. Two of these send figures in painted terra-cotta, representing the inhabitants of Andalusia and Malaga; but the examples are not numerous, though they are remarkable for the beauty and correctness of the modelling. The other

Exhibitor has sent a model of one-half of the interior of the arena for bull-fights at Madrid, made in wood, and containing, it is said, about 4,000 figures, exhibiting the various incidents proper to the place.

There are Eleven Exhibitors in this Section, of these there are :—

4	Holders of a Prize-Medal.
1	Who obtained Honourable Mention.
6	Unrewarded.

11

The number of Exhibitors from the various countries is as follows :—

British Colonies :—			
India	-	-	6
Malta	-	-	1
			7
Spain	-	-	3
United Kingdom	-	-	1
			11

LIST OF AWARDS.

CUBERO, J., (Spain, No. 282). Prize Medal, for Three Terra-cotta-Figures representing the Costumes of Malaga.

EAST INDIA COMPANY, The Hon. (India, Class XXX). Prize Medal, for a series of upwards of Sixty Clay-Figures manufactured at Kishnaghur, representing the various occupations of the Hindoos.

GUTIERREZ DE LEON, R. (Spain, No. 281A). Prize Medal, for Three Terra-cotta-Figures, representing the costumes of Andalusia.

MATA ANGUIERA, J. (Spain, No. 289). Honourable Mention, for an interesting Model of a Bull-fight, illustrated by 4,000 figures.

MONTANARI, N., Upper Charlotte Street, Fitzroy Square (Class XXX., No. 224). Prize Medal, for his very beautiful and interesting series of Statuettes illustrating the customs of the Mexicans.

III.—COLLECTIONS OF PRODUCE.

Under this general title there are to be noticed four very important and instructive collections. Two of them consist of the Imports of Raw Materials and Manufactures into Liverpool and Hull respectively ; One of the Inorganic and Organic produce of India, and One of Unwrought Materials and Manufactures from the State of Maryland, in the United States. The Two most important are those of Liverpool and India, both from their extent and careful arrangement.

UNITED KINGDOM.

The Collection of Imports into the Port of Liverpool, exhibited by the Liverpool Local Committee, contains about Five hundred and fifty different substances ; but as in most cases several varieties of each kind are exhibited, it comprises a far greater number of specimens than is indicated by this estimate. The numerous articles included in this collection are arranged systematically under the following heads :—

Class A.—*Organic Substances.*

Section I.—Animal products.

1. *Mammalia*.
2. *Aves* (Birds).
3. *Reptilia* (Reptiles).
4. *Pisces* (Fishes).
5. *Mollusca*.
6. *Insecta* (Insects).
7. *Radiata*.
8. Articles produced by Insects.

Section II.—Vegetable Substances.

1. Oils and Balsams.
2. Fruits, Nuts, &c.
3. *Materia Medica* (Medicinal Products).
4. Vegetable Juices and Vegetable Extracts.

5. Dyeing Materials.
6. Tanning Materials.
7. Spices.
8. Oil Seeds.
9. Agricultural Seeds.
10. Dietetic Articles.
11. Vegetable Fibres.
12. Timber and Hard Woods.
13. Miscellaneous (Hops and Rushes).
14. Tobacco.
15. Peculas.

Class B.—*Inorganic Substances.*

Section I.—Metallic.

Section II.—Non-Metallic.

To each article are appended the Commercial and Scientific names, and the name of the Class or Order to which they belong, with the quantity imported into Liverpool; the locality whence they were exported, and the use of each substance in the Arts are also indicated.

A glance at the numerous divisions and subdivisions just cited will immediately suggest how valuable and interesting such collections would be to the principal seats of British manufacturing-industry, especially if they were made so comprehensive as to comprise all raw materials; and not only such as are usually imported, but those also which are known to be useful in the arts, or are likely to prove so, from the quantities in which they can be obtained. These Museums of Raw-Produces would, however, be rendered even still more useful by the appointment of energetic curators, fully qualified by previous studies to impart accurate, scientific, and commercial information concerning their contents.

It appears from the statement of Mr. Thomas C. Archer, by whom the Liverpool collection was arranged, that the cost of it was about 400*l.*, which must be regarded as a very small expense, in comparison with the importance of the results to be derived from it. Ten months were occupied in making the collection; but it appears that the greater part of each day was consumed in obtaining the necessary funds, in soliciting samples from the produce-brokers, and in overcoming the hostile prejudices which existed concerning it. The evenings only were devoted to the classifying and naming the specimens, which were obtained by gift or purchase. The time consumed was, it was stated, one of the principal items of cost, as the Liverpool Local Committee had to reimburse to Mr. Archer his salary from the Government, which he ceased to receive during the ten months he was engaged in making the Collection. About 200*l.* were thus expended; but a large portion of this outlay is attributed to loss of time in soliciting subscriptions; for had sufficient funds been placed at the disposal of the Liverpool Local Committee in the first instance, Mr. Archer conceives that a collection ten times as extensive might have been formed, at a cost but little above that of the present one. This indeed was collected under great disadvantages, a few cases being provided as they were required or could be afforded. Much credit is due to the Liverpool Local Committee, and especially to Mr. Archer, for the perseverance which they evinced in prosecuting their labours under such difficulties;

as well as for having produced, notwithstanding, so extensive and valuable an exhibition for so small an expense. As a detailed list of the specimens comprised in this display is given in the *Illustrated Catalogue*, pages 803-817, it is unnecessary to reprint it in this Report.

The Collection of Imports into the Port of Hull, exhibited by the Hull Local Committee, is of the same description as that of Liverpool, but far less extensive. This was to be anticipated from the relative commercial importance of the two towns, and from the nature of the trade at Hull, which is chiefly with the Baltic. Hence Flax, Iron, Tallow, Cereal-grains, Linseed, and Linseed-cake, form important items in it. Altogether there are about One hundred and twenty different substances exhibited, to which are appended the commercial and scientific names, and the quantity of each imported into Hull. A detailed list of the collection is given at page 817 of the *Illustrated Catalogue*.

INDIA.

The next of the series under review is the Miscellaneous Collection of Mineral, Vegetable, and Animal Substances, used by the natives of India, in their various Arts and Manufactures, as well as in Medicine. They were principally gathered from the Bazaars of the Bengal Presidency, by Dr. J. FORBES ROYLE, during his residence in India; but they include also some additions obtained by Dr. FALCONER, in Cashmere, and by Dr. STOCKS, in Scinde.

In the arrangement of this collection for the Great Exhibition, Dr. Royle states that he is much indebted to Mrs. ROYLE for her assistance. It is important, from the vast number of substances contained in it, which amount to between Eleven and Twelve hundred in number, procured from a few only of the Bazaars of India. They are used by the natives for a variety of purposes; but though many of those which are said to be useful as Medicines may not possess active properties, others are known with certainty to be some of the most powerful and efficient drugs; and it may also be inferred that there must be many others possessed of useful properties, though they are but little known in Europe. But independently of their medicinal uses, there are among the various substances many which are useful as food, or in the Arts; as, for instance, the different Cereal Grains and Pulses; Starch-yielding Seeds and Roots, Oil-seeds, Gums and Resins, Dyes, &c., as well as Animal and Mineral bodies. These substances show, at a glance, the resources which the natives of India possess, and have long possessed, for practising many of the Arts in which they attained, at a very early period, a very high degree of perfection, with apparently very imperfect means.

The Collection is farther interesting, both in a literary and scientific point of view, because most of the substances, which are here gathered into a focus, have their properties described in the various works on the *Materia Medica* which are at present in use in India. In those works a variety of synonyms are given, with the names of the same substances as known in the Hindoo, Persian, and Arabic languages, and very frequently in the Greek also. The universal knowledge of these productions is accounted for by the circumstance that the medical works which are in use by the Mahomedan Hakims in India are translations from the Arabic into Persian, with which has been incorporated information from the

writings of the Hindoos. The Arabs, at the Court of Haroun-al-Rashid, it is well known, made translations from the Greek authors, such as Dioscorides; and hence it will be understood why many of the substances, mentioned in such Persian translations as are now in use in India, have both the Arabic and Greek synonyms assigned to them. By means of this Collection we are enabled to examine numerous specimens of Asiatic natural productions, which are all labelled with their synonyms; and hence it is frequently possible to ascertain the very substances which both the Arabs and the Greeks have described, and to which they assigned an Eastern origin. Thus the *Nardus* (Spikenard) of the Greeks may be shown to be the *Jatamansi* of the Hindoos; and Dr. Falconer has identified their *Costus* with the *Koot* or *Koost* of the Arabs, a product of the mountains of Cashmere, which in former times found its way to Europe, and at present forms an extensive article of commerce with China. Many of these interesting parallels have been traced out by Dr. Royle, in his *Essay on the Antiquity of Hindoo Medicine*, as well as in his *Illustrations of Himalayan Botany*. He has also been able to identify some of the plants mentioned in the sacred writings, from their Arabic synonyms, as he has shown in his paper, *The Mustard-tree and the Hyssop of Scripture*.

As a complete list of the articles contained in this invaluable Collection is given in the *Illustrated Catalogue*, pages 893-907, it is only necessary here to state that it comprises Nine hundred and nine substances of vegetable origin, Thirty-two animal products, and Two hundred and two bodies derived from the mineral kingdom. To every specimen its scientific name and synonyms are appended, and also the locality whence it was obtained. The vegetable substances comprise 193 Roots, 10 Woods, 202 Barks, 445 Fruits and Seeds, 12 Galls, and 47 Gums, Resins, and Gum-resins. If a collection of all those products which are but little known were rendered available, under certain restrictions, to the investigations of the scientific chemist, it would undoubtedly do much to advance our knowledge in organic chemistry, and could not fail to be productive of material benefits, not only to the science of medicine, but also to the arts.

UNITED STATES OF AMERICA.

The *Collection of some of the Products and Manufactures of the State of Maryland*, which is contained in an ornamental cabinet made of the principal woods of that State, comprises about Eighty different substances. The chief of them are Ores, Chemicals, and Woods; and the cabinet itself illustrates the uses to which the woods may be applied. The Jury of Class IV. having also awarded a Medal to this interesting collection, it is to be expected that the various objects exhibited will be discussed in detail in their Report; but as the *Illustrated Catalogue* does not contain a list of them, the following summary will not be regarded as misplaced:—

MINERALS.

Anthracite Coal—2 kinds.
Bituminous Coal.
Building-sand.
Copper ore—3 varieties.
Free stone.

Gold-ore.
Granite—2 varieties.
Iron-ore—8 kinds.
Lead-ore.
Marble—3 varieties.
Soap-stone—Steatite.

METALS.

Copper rods.
Copper sheets—3 kinds.
Pig-iron.
Wrought-iron.
Yellow-metal.

METALLIC MANUFACTURES.

Iron Nails.
Shots.
Stereotype-plates.
Types.

CHEMICAL MANUFACTURES.

Alum (*Double Sulphate of Alumina and Potash*).
Bichromate of potash.
Blue vitriol (*Sulphate of Copper*).
Chloride of lime (*Hypochlorite of Lime*).
Chrome-yellow (*Chromate of Lead*).
Chrome-green (*Chrome-yellow and Prussian-blue*).
Copperas (*Proto-sulphate of Iron*).
Epsom salts (*Sulphate of Magnesia*).
Glu (Gelatin).
Magnesia
Magnesia, Carbonate of.
Prussian blue (*Sesqui-ferrocyanide of Iron*).
Red-lead (*Red oxide of Lead*).
Saltpetre (*Nitrate of Potash*).
Soap.
Stearic acid.
White zinc (*Oxide of Zinc*).

BUILDING MATERIALS.

Bricks, 3 kinds.
Fire-bricks.
Lutch-bricks.
Fire-bricks.

VEGETABLE SUBSTANCES.

1. Woods.

Ash.
Beech.

Cedar.
Cherry.
Hickory.
Holly.
Lime.
Locust.
Maple—2 kinds.
Mulberry.
Oak.
Pine.
Poplar.
Walnut.

2. Cereal Seeds and Meal.

Barley.
Buckwheat.
Buckwheat-meal.
Indian-corn, yellow and white.
Indian-corn-Meal.
Oats.
Rye.
Wheat, white and red.
Wheat-flour.

3. Tobacco.

Chewing Tobacco.
Leaf Tobacco.

4. Vegetable Manufactures.

Cotton Goods.
Flax Thread.
Paper.

5. Animal Products.

Belt-Leather.
Calf Leather.
Cloth, of mixed cotton and wool.
Felt.
Morocco Leather.
Silk.
Woollen Cloth.

The number of Exhibitors in this Section is Four, to all of whom Prize Medals have been awarded.

The following is the classification of the contributors according to their respective countries :—

America	-	-	-	-	1
British Colonies (India)	-	-	-	-	1
United Kingdom	-	-	-	-	2
					4

LIST OF AWARDS.

ARCHER, THOMAS C. (Liverpool, Class XXIX., No. 270). Prize Medal, for the Collection of the samples of Foreign Articles imported into Liverpool within the last five years, of which he was the Collector and Arranger.

HULL LOCAL COMMITTEE (Class XXIX., No. 290). Prize Medal for the Collection of Staple Imported Articles of the port of Hull.

MARYLAND, COMMITTEE OF (United States, No. 371). Prize Medal (*the same Award being given by the Jury of Class IV.*), for a Cabinet containing specimens of some of the products and manufactures of the State of Maryland.

ROYLE, Dr. J. FORBES, India. Prize Medal, for a Collection of Mineral, Vegetable, and Animal Substances, useful in Medicine and the Arts.

To which may be added, the Award of a Prize Medal to the SULTAN OF TURKEY, for numerous examples of Soaps, Candles, Confectionary, and Pipes, which have been noticed in the respective articles on those subjects also included in the present Report.

D.—MANUFACTURES FOR PERSONAL USE.

I.—DRESSING-CASES, WRITING-DESKS, WORK-BOXES, &c.

Although Writing-desks are comprised in the list of articles allotted to Class XXIX., yet, as they are also included in that of Class XVII., to which they appear more properly to belong, they are displayed in both. The latter class, however, contains the greater number of examples; and, likewise, the most important of those which are covered with Russia and other leathers, and either "chequered" or ornamented after the manner of the bookbinder. Work-boxes are not nearly so numerous, and are chiefly from Belgium. Dressing-cases, consequently, form the chief portion of the contributions in the branch of art now under consideration; and they are exhibited almost exclusively by British and French manufacturers who appear to monopolise the supply of these articles. On account, therefore, of the prominent position of Dressing-cases in Class XXIX., they will be chiefly treated of in the subsequent remarks; Writing-desks and Work-boxes being, however, noticed, wherever they call for especial observation. The latter may, indeed, be regarded, in some instances, as modifications of dressing-cases, in which some of the contents are allowed to predominate over others; for those cabinets very frequently contain writing materials or apparatus for ladies' work: and, on the other hand, the fittings of writing-desks or work-boxes sometimes comprise a toilette-set more or less complete. Of both of these kinds several examples are shown in the Exhibition.

DRESSING-CASES.—The tasteful and compact arrangement of these most useful receptacles belongs to a very modern period; but they have, probably, not even yet attained the high degree of elegant convenience of which they are capable. In their primitive character, however, which is simply that of containing some of the materials of personal adornment, even the dressing-case is of considerable antiquity. There is a remarkable allusion to coffers of ivory, probably wrought into the forms of buildings, and containing perfumes, in Psalm xlv. 8, where the passage describes the dressing of a queen by her maids of honour, when preparing to receive her royal spouse.

At a later period, in the days of Roman luxury, the toilette-box of a Roman lady seems, at least sometimes, to have exhibited a methodical arrangement of its contents, and to have been elaborately decorated with the best art of the period.

"In the spring of 1794," says Carl August Böttiger, "some labourers digging for a well in the garden belonging to the convent of the nuns of St. Paul, not far from the Suburra, at the foot of the Esquiline-hill, came upon a large subterranean chamber filled with crumbled ruins; from which, after some time, they succeeded in extricating a chest filled with an ancient Roman toilette-apparatus." The casket was of silver, as well as all the articles found with it, and the same authority continues to state that the dressing-box itself was 2 feet in length, 1½ foot in breadth, and 1 foot in height. It was quadrangular, and consisted of two truncated pyramids joined at their bases, one of which constituted the box and the other the cover. The exterior ornament of this cabinet represented a variety of most interesting sculptures relating to the adorning and bringing-home of a bride; and the inscription "*Secunde et Projecta Vivatis*" seems to confirm the supposition that the cabinet was a female dressing-case and a wedding gift.*

With this ancient casket was also discovered another receptacle, of the species which the Romans denominated *Capsula*; and which, by the chains attached to it, appeared to be intended for suspension from the arm. This vessel formed a box of sixteen sides on the exterior, having a circular cover; and greatly resembled a *Serinium* for containing manuscript rolls, especially as it was decorated on the outside with raised figures of eight of the Muses, interchained with garlands; the remaining Muse being placed on the summit. The capsula measured one foot in height, and was about 15 inches broad at the base. Within the case was a flat top or tablet of copper, dividing it into one large central compartment, surrounded by four of a smaller size, probably originally intended to receive volumes of books. The contents, however, were boxes, essence-vials, small paterne and ewers, several toilette-spoons, a taper-stand in the form of a closed hand, a beautiful little vase, covered with arabesque figures, and some ornaments for a litter; all which furniture was of silver. The size, the extent, and the luxury of these antique dressing-cases will, however, be considered less remarkable, when it is remembered that the perfumes, the ornaments, the mirrors, and all the toilette-furniture of a female, was called by the Roman juriconsults "*Mundus Muliebris*," or a woman's world; and, indeed, they have their parallels in the Great Exhibition.

Cases for combs and mirrors, which were usually kept together, were common in England from the latter half of the sixteenth century; when the haberdashers and milliners, who dealt in foreign small-wares, had increased to an extent unknown before in all the streets of the metropolis, and in the Upper-Pawn or gallery of the Royal Exchange. Some of the cabinets of this period also contained bottles of sweet waters, and pomanders, or perforated silver balls for perfume, for neutralizing disagreeable odours or infection. Such a toilette-case was presented in 1562 to Queen Elizabeth, as a New Year's gift, from Sir John Alec; it being described as a coffer of wood, carved, painted, and gilt, with combs glasses, and balls.

In general, however, down to perhaps the middle of the eighteenth century, the most costly toilette-furniture seems to have consisted of a great variety of articles which covered the dressing-table. It is possible that the thought of fitting up a

* Böttiger's *Sabina oder Morgenstunden in dem Putzzimmer einer reichen Römerin*, p. 62, Leipzig, 1803; translated in the *New Monthly Magazine*, 1818, vol. x., p. 419.

single receptacle with various useful contents, was suggested by the boxes brought from Japan towards the close of the seventeenth century. These were made to contain a number of smaller boxes for powder, patches, &c., of different shapes, and contrived neatly to fit each other. In the "Fop Dictionary," contained in the very curious tract on female costume, published by Evelyn in 1690, entitled "*A voyage to Marry-land, or the Lady's Dressing-room unlocked*," a cassette of silver filigree is mentioned, and explained to signify a "dressing-box;" but, from the description, it really appears to have been a case for perfumed waters. All the rest of the appointments consist of a profusion of scattered luxuries, like those which are also described in the commencement of Pope's "Rape of the Lock."

A lady's dressing-case of the present day would appear to have been originally contrived with the view of containing almost as many articles of convenience or luxury as were enumerated by Evelyn as belonging to a lady towards the end of the seventeenth century; and however appropriate such may have been to that period, it is certainly ill adapted for travelling in the nineteenth century; excepting, perhaps, for long voyages in half-civilised countries, or unfrequented tracts where the ordinary necessities of the toilette are not procurable. In travelling, however, through the polished cities of Europe, it is not more needless to be encumbered with a store of gold, when circular notes are obtainable, than it is to carry large quantities of perfumery or any other similar article which can be readily purchased. And if the many vessels usually introduced into a lady's dressing-case were reduced in number and size, it might become nearly as portable as that of a gentleman. Yet, although this is obvious, it is remarkable that not a single example of a lady's dressing-case is to be found in the Exhibition suitable for convenient package or for rapid travelling, when superfluous baggage is very undesirable. At the same time there are numerous instances of gentlemen's dressing-cases, extremely portable, mostly made of leather, which has been found better adapted for the purpose than wood.

The ordinary description of dressing-cases, writing-desks, and work-boxes, admit of classification into two very distinct branches of manufacture, allied, however, by the contents of the cases, some of which are the same in both kinds. The first class is that in which the case is composed of hard-woods, and its ornamentation due entirely to the arts of the cabinet-maker and buhl-worker. The second class comprises all those examples in which the body of the box is made of soft-woods, or moulded in pasteboard, and afterwards covered with leather of various kinds. The exterior is then ornamented, either in a simple style, with creasing-tools guided by means of a wooden straight edge, or more elaborately with tools similar to those of the bookbinder. Beside wood and leather, it should be stated that papier-mâché has been introduced into this manufacture, as indeed into many others; and frequently with more regard to a glittering appearance than to beauty of design, of which, however, this material is perfectly susceptible. The natives of India, China, and Japan have employed their various arts in the manufacture of dressing-cases, desks, and work-boxes, suitable for the use of Europeans, and have adorned these respective productions according to their own peculiar styles of ornament.

The articles on which the Jurors of Class XXIX. were principally required to decide, are those belonging to the first two of the preceding varieties: yet, on

consulting the Award-books, it would appear that other Juries have also investigated the merits of some of those productions. It is, however, satisfactory to find that they have, by their decisions, confirmed the awards of the Jury to which they properly belong. Those Awards have been, in most instances, omitted to the list for Class XXIX., as no exhibitor is entitled to more than one recompense for the same description of goods: they are, however, for obvious reasons, mentioned in this Report.

AUSTRIA.

The chief contributions in the Austrian Department are a Dressing-case, and a Dressing-table, covered with velvet, and ornamented with pierced ivory, in which both the material and the ornament are evidently ill-adapted for the intended purpose. Beside these, there are some Ladies' Work-boxes of wood, and Dressing-cases and Work-boxes of papier-maché, both of which varieties are of an inferior description, and not remarkable for cheapness.

BELGIUM.

Five Exhibitors, from that once fashionable watering-place the town of Spa, contribute numerous articles of the so-called Spa-ware, consisting of Work-boxes, Netting-boxes, Reading-desks, Portfolios, Glove-boxes, and other similar articles: these are made of sycamore or maple wood, which has been coloured by immersion in the natural ferruginous waters of the place. The iron compounds (probably chiefly tannate of iron), which are formed by the combination of the peroxide of iron with the vegetable juices, not only develop the minute structure of the grain, but also give an agreeable slate-tint to the wood, which then forms a pleasing background to the elaborate paintings with which the manufactures are embellished. After having been decorated, they are preserved from injury by several coats of varnish, which still farther increases the beauty of the wood by bringing out the grain.

BRITISH COLONIES.

The contributions from the British Colonies are numerous, but they must, in most cases, be regarded rather as curiosities than as articles of large sale. From *Ceylon* there is only one article, namely, a Desk of Porcupine-quills, arranged parallel to one another, and surrounded with a border of carved ivory, the sunken portions being filled with colour. The *Indian* Court contains numerous specimens of boxes made of a variety of materials, and ornamented with great taste in several different patterns. Amongst these may be enumerated a Desk and Envelope-box of ivory and sandal-wood, and a Porcupine-quill Box from Calcutta; a beautifully and elaborately carved Cutch-box, and several specimens of boxes from Bombay, ornamented with tasteful and minute inlaying. *New South Wales* contributes a Desk of polished woods of different kinds. From *New Zealand* there is a box which may be regarded as a native dressing-case, as it is used by the aborigines to contain their head-dresses. In the *South African* Section is exhibited an olive-wood work-box, which has been sent from the GROENKLOOF MISSIONARY STATION. And lastly, from *Van Diemen's Land*, Mr. McNAUGHTEN

contributes a Writing-desk and a Work-box, made of musk-wood, and inlaid with pine, black-wood, she-oak, and myrtle.

CHINA.

There are Three Exhibitors of Writing-desks and Work-boxes in the Chinese Department. Mr. COPELAND sends a Writing-desk used by the Chinese, which contains pencils and other materials for writing, and also a *Swan-pan* or calculating board; and a Japanese writing-desk, inlaid with mother-of-pearl. Two examples of Japan desks are also exhibited by HEWETT and Co., one of which is ornamented with a bouquet of flowers formed of mother-of-pearl, and the other with a landscape painted in relief with gold bronze. These specimens are interesting as belonging to a class of goods now much imitated by the papier-mâché manufacturer, but must not be regarded as of the highest class of Japan-ware. The now most celebrated manufacturer of these goods, says our colleague, M. Natalis Rondot, is Hip-qua of Canton, who has made for himself a beautiful, though small, collection of lac-ware caskets. M. de Siebold, of Leyden, also possesses many of the most beautiful examples extant; and the Museum of the Hague also contains many rich specimens. A Camphor-wood work-box, with carved ivory fittings, is sent by HANCOCK and Co.

EGYPT.

The Egyptian Court contains a writing-case made of Alizier-wood.

FRANCE.

Although the Exhibitors in the French department are few, their display, chiefly of Dressing-cases, is most gorgeous and costly, and the articles contributed are remarkable alike for their beauty, brilliancy, and variety. The cabinet-maker of Paris stands unrivalled for the elegant lightness of his designs, and the exquisite finish of his workmanship; and the same is true of the French artist in buhl and marqueterie. Hence it will be readily credited that the plain French caskets are unsurpassed, and the more ornate unequalled. With regard to the fittings—whilst due praise must be given for the taste displayed in the designs, the spirited chasing, the execution of the enamel, and the due balance of bright and frosted work, yet at the same time it must be stated that the French silver has not the high degree of finish usual in the fittings of an English dressing-case. This defect is in a great measure to be ascribed to the metal being polished without the workman having recourse to those numerous preparatory manipulations which give evenness to the surface. Hence the undulations of surface betray how much has been done by the lurrisher and how little by the polisher. The cutlery and glass are also inferior. It must, however, be stated that these dressing-cases are relatively far cheaper than those of the English; and although each silver article is lighter, yet, as there are more fittings and their size larger—for a ewer and a washing-dish are usually included—in the aggregate there is a much greater weight of silver given in proportion to the amount paid. This is in some measure due to the almost nominal duty on silver plate in France, which is only 11 francs per kilogramme ($3\frac{1}{2}d$ per troy ounce of 480 grains). It contains 50 parts of alloy

in 1,000, with a toleration of a farther quantity of alloy, not to exceed 11 parts per 1,000. The French have not yet succeeded in the manufacture of Russia and other better classes of leather dressing-cases, and but few examples are to be found in their Section; these appertain to the class of goods belonging to Class XVII., the Jury for which has examined them.

In 1847 there were in Paris One hundred and fifty-eight dressing-case, work-box, and writing-case makers, employing Nine hundred and eighty workpeople (882 men, 30 women, 68 boys), who manufactured goods valued at 155,120*l*.*

PERSIA.

The Persian Court contains examples of inlaid and japanned Work-boxes, and also a Pen-case, which are contributed by Mr. MILLS, jun., who states that they were collected by his father during his residence in that country. They may, therefore, be considered as truly representing this description of manufacture in Persia.

PORTUGAL.

HIS MAJESTY THE KING OF PORTUGAL contributes an elegant Ebony Writing-case, inlaid with ivory.

SAXONY.

One Exhibitor in the Saxon Department, W. ROCKHAUSEN (No. 172), sends several creditable Glove-boxes, made of rosewood and sycamore, some inlaid with mother-of-pearl. The prices of these are 42*s*., 45*s*., and 60*s*. per dozen. There is also a lady's Dressing-case in his collection, valued at 60*s*., which, from its simplicity, recalls the remark of Böttiger, after describing the Roman toilet-box before spoken of, when he says, "Our ladies are generally satisfied with boxes of atlas (satin) or rosewood, inlaid with brass or silver, while the ancient fair condescended not below silver materials, and the workmanship of a sculptor."

SWEDEN.

The Swedish Court contains a Writing-case which calls for no particular comment.

UNITED KINGDOM.

The Exhibitors of Dressing-cases and Work-boxes principally, but also of Desks, in Classes XXIX. and XVI., are Nineteen in number. Beside these, there are Fourteen Exhibitors in Classes XXII., XXVI., XXVIII., and XXX., whose productions did not come under the notice of the Jury of Class XXIX.; and the fact that writing-desks and writing-cases are exhibited chiefly in Class XVII. has been already adverted to. Confining the present remarks, therefore, to the two first-named Classes (XXIX. and XVI.), it may be stated, that the general display of British dressing-cases, &c., is highly creditable to the numerous Exhibitors.

* *Statistique de l'Industrie à Paris*, Part II., p. 821.

Beside many examples of the more usual kinds of wood dressing-cases, remarkable for their cheapness and excellence, it comprises some examples of a more costly description, which, in comparison with those in the French Department, are, unquestionably, higher in price, even after making all allowances for the lower duty of silver in France. They are, however, exquisitely finished in all the details of the case and fittings, which are unsurpassed for excellence of workmanship. Indeed, the silver-work is far higher in point of finish than the French, a circumstance which has already been commented upon. In Leather Dressing-cases the British have no competitors, either for cheapness or excellence of workmanship; and the numerous examples which are displayed were highly praised by the Foreign Jurors.

It is chiefly within the last twenty years that Leather Dressing-case making has attained its present high state of development; and this is principally to be attributed to the liberal support of the better class of workmanship given by the leading houses in the trade, and to the judicious encouragement of the individual efforts of their workmen by a due appreciation of their merits. The improvements which have taken place within the last ten years in the manufacture of dyed leathers in England have also had a very beneficial effect on this branch of manufactures. The number of Leather-case makers in Great Britain is not large, there being only 468 workmen and 250 females. As the best description of work is produced principally in London, the greatest number of workmen are there employed, amounting to 308, the workwomen being only 20; whilst, in Sheffield, there are no less than 200 females, who are considered to be very skilful, and only 47 workmen, employed, who are chiefly occupied with the more common dressing-cases, and in making the better kinds of razor-cases. In Birmingham, there are 50 workmen and 30 girls, also engaged on articles of a second class. Beside these, there are many workmen employed in making wood dressing-cases and the various fittings; but the Reporters have not been able to ascertain their number. It may be remarked, that the glass trays and covers are made principally in London and Birmingham, whilst Sheffield produces the metal covers, and shares with London in the supply of the cutlery. The hinges, handles, and other metal work, are obtained chiefly from Birmingham.

One of the largest Exhibitors of Dressing-cases, Work-boxes, and Desks, in Class XXIX., is our colleague, Mr. J. J. MECHI, who is, by his position of Juror, precluded from competing for a recompense. In justice, therefore, to the excellence of his productions, the following resolution was proposed to the other Jurors of this Class by M. Natalis Rondot, seconded by Viscount Canning, and carried unanimously, on the 23rd of July 1851:—

"M. J. J. Mechi a exposé une collection de Nécessaires-de-voyage, de Papeteries, de Tables-et Coffrets-à-ouvrage dans laquelle on trouve une remarquable diversité de modèles et d'ornemens."

"Membre du Jury de la Classe XXIX, M. Mechi ne peut en raison de cette haute position recevoir aucune récompense. Le Jury regrette qu'il ne lui soit permis, pour cette raison, d'inscrire le Nom de M. Mechi parmi les plus dignes; mais il est heureux de constater la belle, importante, et intelligente fabrication des ouvrages que M. Mechi a exposés."

WURTEMBERG.

Wurtemberg is represented by one firm, WEBER and Co., No. 86, who exhibits stained Sycamore Work-boxes. The sycamore is first coloured with an artificial ferruginous water, and, after staining, the block is cut up into veneers, which are used to cover the work-boxes. These are not ornamented with paintings like the Spa-wares of Belgium, already noticed.

There are Fifty Exhibitors in this subdivision. Of these are:—

5	Holders of a Prize Medal.
5	Who obtained Honourable Mention.
40	Unrewarded
50	

The number of Exhibitors from the various countries is as follows:—

Austria	-	-	-	-	3	France	-	-	-	-	-	6
Belgium	-	-	-	-	5	Persia	-	-	-	-	-	1
British Colonies:—						Prussia	-	-	-	-	-	1
Ceylon	-	-	-	1	7	Portugal	-	-	-	-	-	1
Gibraltar	-	-	-	1		Saxony	-	-	-	-	-	1
India	-	-	-	1		Sweden	-	-	-	-	-	1
New South Wales	-	-	-	1		United Kingdom (beside 14 in Classes						
New Zealand	-	-	-	1		XXII., XXVI., XXVIII., and XXX.)	-	-	-	-	-	19
South Africa	-	-	-	1		Wurtemberg	-	-	-	-	-	1
Van Diemen's Land	-	-	-	1								—
China	-	-	-	-	3							50
Egypt	-	-	-	-	1							—

LIST OF AWARDS.

ASPREY, CHARLES, 166 New Bond Street (Class XXIX., No. 50). Honourable Mention, for a beautiful set of Twelve malachite and or-molu Table-ornaments, the price of which was stated to be 240*l.*; and also for some Dressing-cases and Writing-desks.

AUCOC, sen., Paris (France, No. 1052). Prize Medal (*the same Award by the Jury of Class XXIII.*), for a collection of very rich and elegant Dressing-cases; some with silver and others with *vermeil* (or silver gilt) mounts and fittings. The most remarkable objects are: a Dressing-case of Yew (*Bois d'if*), value 80*l.*, with chased silver mounts and fittings; and a Lady's ebony Dressing-case, value 400*l.* It is furnished with *vermeil* fittings, comprising, besides numerous trays and jars, a square washing-basin and ewer, also of *vermeil*. Taking the weight of silver and the amount of workmanship into consideration, the prices quoted were considered to be very reasonable.

AUDOT, L. D. J., Paris (France No. 11). Prize Medal (*the same Award by the Jury of Class XXIII.*), for a collection of very excellent and tastefully ornamented Toilet-boxes, comprising a Lady's Dressing-case of ebony and buhl, with silver mounts, valued at 300*l.*, and containing 183 ounces troy of silver; a rustic ebony and buhl Dressing-case (180*l.*), containing 148 ounces troy of silver; and a

Gentleman's ebony and buhl Dressing-case, with elegant silver mounts, the price of which was 57*l*. The prices of these and other articles were considered to be very reasonable.

AUSTIN, GEORGE, Dublin (Class XXIX., No. 36). Honourable Mention, for a Lady's Dressing-case, with silver fittings, and a Gentleman's Dressing-case, made of Irish bog-yew, also with silver fittings; and for Writing desks of Coromandel-wood, which are more remarkable for the goodness of the workmanship than for any excellence in the ornaments. The price of the Lady's Dressing-case is 90*l*., and that of the Gentleman's 80*l*.

EDWARDS, T. J., King Street, Holborn (Class XXIX., No. 89). Prize Medal, for Dressing-cases and Writing-desks of the very highest class of workmanship, both as regards the box and the mounts, but very high in price. In the construction of the boxes a friction-hinge is employed, which excellent contrivance admits of the various compartments remaining open to any required extent and avoids the necessity for numerous loose trays. The more remarkable objects supplied by this Exhibitor are a Lady's Dressing-case, with silver-gilt fittings, value 160*l*., a Gentleman's Dressing-case, and a Gentleman's Writing-desk, value 50*l*. The Lady's Dressing-case contains a tooth-brush tray, 2 soap-trays, nail-brush tray, a tooth-powder tray, a salve-box, 3 scent bottles, 2 large jars, 2 pairs of scissors, 2 button-hooks, a piercer, 2 corkscrews, 2 pen-knives, tweezers, 2 bodkins, 2 pearl-backed hair-brushes, 2 tortoiseshell hair-brushes, 2 tortoiseshell combs, a shoe-horn, ink-bottle, a gold pen, a gold pencil-case, and a blotting-book.

LAURENT, F., Paris (France, No. 564). Prize Medal, for great excellence in workmanship and in the design of numerous caskets, the most remarkable of which are, an Ebony and Buhl Dressing-case, with silver mounts, value 127*l*.; a Buhl Jewel-box, 7*l*. 10*s*.; a Buhl Writing-desk and Papetiere, 20*l*.; and a Shawl-box, 26*l*.

LEUCHARS, WM., 38 Piccadilly (Class XXIX., No. 44). Prize Medal (*the same Award by the Jury of Class XXIII.*), for various Dressing and Travelling-cases, tastefully designed, and of excellent workmanship. The following are some of the articles deemed worthy of special notice:—A Lady's Dressing-case of walnut-tree, clamped with pierced silver plates and corner-pieces in the mediæval style, and fitted with a variety of silver-mounted toilette-bottles, with a looking-glass and candle-holders, the value of which was stated to be 300*l*.; a very convenient Sack-de-voyage for a gentleman, in plain morocco; and a cylindrical morocco case containing a plated travelling Tea-equipage, including a tea-pot, an apparatus for boiling water, and knives and forks, the price of which is 18*l*.

MARIN, JONA STEPHEN, Spa (Belgium, No. 414). Honourable Mention (*Prize Medal awarded by the Jury of Class XXVIII.*), for a large collection of Spaware, comprising numerous examples, all well manufactured and embellished with fair copies of paintings, and original and tasteful groups of flowers. Work-boxes are exhibited, ranging in price from 2*l*. to 5*l*. 5*s*. each, and Blotting-cases from 3*l*. to 5*l*. each, according to the amount of work in the ornament.

MISSON, E. and L., Spa (Belgium, No. 412). Honourable Mention (*the same award by the Jury of Class XXVIII.*) for several well-finished articles of Spaware, comprising Work-boxes, Netting-boxes, in nests of five sizes, &c., ornamented with paintings, for the most part very creditably executed. The pieces most

deserving of notice are, a large Work-box, 3*l.* 8*s.* ; one somewhat smaller, embellished with a representation of a Spanish bull-fight, 3*l.* 4*s.* ; and Netting-boxes, from 2*s.* upwards.

STRUDWICK, THOMAS, 14 New Bond Street (Class XXIX., No. 42). Honourable Mention, for Dressing-cases of the cheaper description, but yet of very good workmanship. As an example may be cited a Gentleman's Dressing-case, made of yew and clamped on the outside with ornamental German silver plates and corner-pieces, the mounts and covers of the trays and jars being of solid silver. It contains 3 scent-bottles, an ink-box, a light-box, tooth and nail-brush trays, a shaving-soap-box, a square soap-box, a tooth-powder-box, 2 salve boxes, 2 razors—2 pair of scissors, a nail-file, a punch, a button-hook, 4 tooth instruments, and 2 penknives. The price of this case is only 38*l.*

II.—PARASOLS AND UMBRELLAS.

1. *Parasols*.—The first employment of those portable protections from the sun and rain called Parasols and Umbrellas, probably commenced with the former of those inventions, in a region where the intensity of the light and heat rendered a shade almost indispensable. In the contrivance of such a shelter, the pole and top of a tent seem to have originally suggested the well-known form, which, in its general features of a dome or a canopy still remains unaltered. But as the materials of the ancient parasol rendered it a heavy instrument, it appears to have been always carried by an attendant over the head of the owner. Hence it became an indication of high rank. The recent discoveries at Nineveh, show that the Parasol "was generally carried over the king in time of peace, and sometimes even in war. In shape," continues Dr. Layard, "it resembled very closely those now in common use; but it is always seen open in the sculptures. It was edged with tassels, and was usually adorned at the top by a flower or some other ornament. On the later bas-reliefs, a long piece of embroidered linen or silk, falling from one side like a curtain, appears to screen the King completely from the sun. The parasol was reserved exclusively for the monarch, and is never represented as borne over any other person." It will be remembered, that this interesting statement refers to the Assyrian empire, between the years 1200 and 606 before the Christian era.

There appear to have been more than one species of sun-shade proper to Egypt, as represented in the sculptures and paintings of that country. Of these, one appears to have been either a fan of palm-leaves or coloured feathers, fixed upon a long handle; in other cases, the figure seems intended to represent the canopy of a parasol, drawn with the imperfect skill of an Egyptian artist. Sir Gardner Wilkinson has engraved a delineation of an Ethiopian princess, travelling in her chariot through Upper Egypt to Thebes, wherein the car is furnished with a kind of umbrella fixed on a tall strong staff rising from the centre; and in its arrangement closely resembling the chaise-umbrellas of the present time.

From the very limited regal use of the parasol in Asia and Africa, it seems to have passed both as a distinction and a luxury into Greece and Rome, especially in the declining ages of those countries. The *Skiadeion*, or Day-shade of the Greeks, was carried over the head of the effigy of Bacchus; and the daughters of

the aliens at Athens were required to bear parasols over the heads of the maidens of the city, at the great festival of the Panathenæa. At Rome, when the veil could not be spread over the roof of the amphitheatre, it was the custom for females and effeminate men to defend themselves from the sun with the *Umbrella* or *Umbraculum* of the period; and this covering appears to have been formed of skin or leather, capable of being raised or lowered as circumstances might require.

Although the use of the parasol was thus early introduced into Italy, and had probably been continued there as a vestige of ancient Roman manners, yet so late as 1608, Thomas Coryat notices the invention in such terms as indicate that it was not commonly known in his own country. After describing the fans of the Italians, he adds, "Many of them do carry other fine things of a far greater price, that will cost at least a ducat (5s. 6d.), which they commonly call in the Italian tongue *Umbrellæes*, that is, things that minister shadow unto them for shelter against the scorching heat of the sun. These are made of leather, something answerable to the form of a little canopy, and hooped in the inside with divers little wooden hoops that extend the umhrella in a pretty large compass. They are used especially by horsemen, who carry them in their hands when they ride, fastening the end of the handle against one of their thighs; and they impart so long a shadow unto them, that it keepeth the heat of the sun from the upper part of their bodies."

It is probable, that a similar contrivance existed at the same period in Spain and Portugal, whence it was taken to the New World. Defoe, it will be remembered, makes Robinson Crusoe state that he had seen Umbrellas employed in the Brazils, "where they were found very useful in the great heats which are there;" and that he constructed his own instrument in imitation of them. "I covered it with skins," he adds, "the hair outwards, so that it cast off the rain like a pent-house, and kept off the sun so effectually, that I could walk out in the hottest of the weather with greater advantage than I could before in the coolest." In commemoration of this ingenious production, one species of the old heavy Umbrellas was called "The Robinson."

But the use of such a defence against the heat was not unknown in England, though probably only used as a luxury, even in the early part of the seventeenth century. Ben Jonson mentions it by name in a comedy produced in 1616; and in 1640 it occurs in Beaumont and Fletcher's "Rule a Wife and have a Wife," when Althea says—

"Are you at ease? Now is your heart at rest?
Now you have got a shadow, an Umbrella,
To keep the scorching world's opinion
From your fair credit."—

As a canopy of state, the use of the Umbrella appears to have been general in Southern Europe from a very early period: it is found in the ceremonials of the Byzantine Church; it was borne over the Host in processions; it formed part of the pontifical regalia; and about A.D. 1179, when Pope Alexander III. took refuge in Venice from the Emperor Frederick I., he bestowed on Sebastiano Zani, the Doge and his successors, the privilege of placing the Pontifical parasol over their armorial ensigns.

Without, however, attempting to trace any further the frequent appearance of the parasol in the early history of Europe, we may be allowed to make a few

statements regarding the Parasol of the Chinese. According to the statement of Dr. Morrison, Parasols and Umbrellas in the Celestial Empire appear to be first referred to in books printed about A.D. 300; * the tradition being, that the *San*, which signifies to cover or shade off the sun and rain, originated "in standards and banners waving loose in the air." This date, however, has been recently proved to be many centuries too modern, by the evidence of a very curious book of Chinese ceremonies, entitled *Tcheou-Li*, or The Rites of Tcheou, for the first time translated and published by the late M. Biot.† The author of the work was Prince Tcheou-Kong, brother of Wou-Wong, the first Emperor of the Tcheou dynasty, who wrote it at the beginning of the twelfth century before the Christian era. In this valuable work is contained a descriptive detail of the duties of the several officers belonging at the period to the Chinese court; and it directs that the workmen making the wheels of the Imperial carriages should also place the *dais* upon the cars. The figure of this *dais*† contained in the Chinese edition of the *Tcheou-Li*, and the particular description of it given in the explanatory commentary of Lin-hi-ye, both identify it with an umbrella.‡ The latter describes the *dais* to be composed of 28 arcs, which are equivalent to the whalebone ribs of the modern instrument, and the staff supporting the covering to consist of two parts, the upper being a rod 3-10ths of a Chinese foot in circumference, and the lower a tube 6-10ths in circumference, into which the upper half was capable of sliding.

It is probable, that the most general use of the Parasol in France and England was adopted from China, about the middle of the seventeenth century. At that period, pictorial representations of it are frequently to be found, some of which exhibit the peculiar broad and deep canopy belonging to the *Lo San*, or large parasol of the Chinese officers of Government, carried by attendants. In 1664, Evelyn states, that a Jesuit showed him such a collection of varieties as he had never seen before, sent from the missionaries of Japan and China to their order at Paris, to be preserved in their repository; but brought for them to London by the East India ships. In the engraved title-page to his *Kalendarium Hortense*, published in the same year, a black page is represented as bearing a closed umbrella or sun-shade.

2. *Umbrellas*.—In the preceding notices, these artificial shades have been regarded chiefly as protections against the light and heat of the sun, with but slight reference to their equally great value as defences against rain. Their adoption for this purpose appears to have been much later than their use in the former capacity, and to have been but very slowly established in England. It is, however, mentioned by Gay, in his *Trivia*, so early as 1712, in one of his many vivid descriptions of the manners at the beginning of the last century; and he appears to affirm that any defence, excepting from the rain, could never be required in the streets of London. The verses in question are suggestive of two very curious observations connected with the history of the articles under con-

* Dr. R. Morrison's *Chinese Dictionary*, vol. i., part 2, p. 694, No. 8802.

† *Le Tcheou Li, ou Rites du Tcheou : Traduit pour la Première fois du Chinois par feu Edouard Biot*. Paris, 1851. 8vo. Vol. II., p. 475.

‡ M. Biot's Translation, p. 488.

§ *Ib.*, p. 478.

sideration. From the beginning of the present century, the use of the Parasol as a protection against the sun has been increasing in England until it has become universal amongst females, contrary to the declaration of the concluding lines. The Umbrella, on the contrary, though apparently well known in Gay's time, did not come into general use until the close of the last century. Jonas Hanway is stated to have been one of the first men who commonly carried one, for it was usually regarded as proper to females only;* and he, probably, brought the practice from Persia or from the Continent. In the *Statistical Account of Glasgow*, by Dr. Cleland, it is related that about the year 1781 or 1782, the late Mr. John Jamieson, surgeon, brought with him an Umbrella on his return from Paris, which was the first seen in the city, and attracted universal attention. The earliest specimens of the English Umbrella were made of oiled-silk, which, when wet, were exceedingly difficult to open or to close: the stick and furniture were heavy and inconvenient, and the article generally very expensive.† Its transition to the present convenient portable form, is due partly to the substitution of silk and gingham for the heavy and troublesome oiled-silk, which admit of the ribs and stretchers being made much lighter; and also to the many ingenious mechanical improvements in the framework which have been made from time to time, chiefly by English and French manufacturers, several of which have been patented. No change has proved a greater convenience than that from the old-fashioned ring and string, for securing the Umbrella when closed, to the clip and Indian-rubber braid; and yet, before this was accomplished, many transitions had to be passed through, which must be familiar to most persons: these outward improvements may be taken as the type of numberless others which are not appreciated, because they are not generally seen and understood.

We may now pass to the consideration of the various contributions from the different countries, first, however, premising that from England and France the largest quantities have been received.

AUSTRIA.

The Parasols and Umbrellas of Austria are gaudy, and not very well finished, and indeed, evince but little skill or taste on the part of her Two manufacturers who exhibit the finished articles.

Notwithstanding this, it appears that they are exported to some extent to several of the Mediterranean markets, for which it appears that they are well adapted. The prices at which they are sold are considerably higher than those for which goods of a better quality can be furnished by the English maker: in illustration

* That the use of the Umbrella was once considered as too effeminate for men, is remarkably illustrated by the following passage contained in *The Female Tattler* of Dec. 12, 1709:—"The young gentleman belonging to the Custom-house, that, for fear of rain, borrowed the Umbrella at Will's Coffee-house, in Cornhill, of the mistress, is hereby advertised, that to be dry from head to foot on the like occasion, he shall be welcome to the maid's pattens."

† An advertisement published in 1787 by Thomas Folgham, 112 Chespside, states that he has "a great assortment of his much-approved pocket and portable Umbrellas, which, for lightness, elegance, and strength, far exceed anything of the kind ever imported or manufactured in this kingdom. All kinds of common umbrellas prepared in a particular way, that will never stick together."

may be cited the cheapest children's parasols of each of the two makers, which are sold wholesale at 1s. 1½d. and 2s. each respectively, and women's silk-parasols of very ordinary finish at 7s. and 9s. each. The other Exhibitors send merely parasol and umbrella handles, and sticks, which are generally reasonable in price, and of fair workmanship. The following are quotations of some of the cheapest, as well as the dearest of these productions. WEISS, J., Umbrella-sticks with bone handles, 9d. each; parasol sticks of white wood, and long bone-handles, 1s. and 1s. 3d. each; TIFEE, A., carved bone Umbrella-sticks, with handles of bone, 2s. 6d. and 3s. 6d.; with ivory handles fairly carved, 10s. 6d. each; LANDRA, J., Umbrella and Parasol sticks of carved wood, 4½d., 5d., and 10½d. each; these latter were considered to be cheap. The ivory and bone carving, however, bears no comparison in point of design and execution with the carving of the Meerschmum pipe-bowls reviewed in another article.

BELGIUM.

The contributions from Belgium consist of Parasols only, and were sent chiefly by One Exhibitor; for although parasols covered with rich lace are exhibited in the North-East Gallery with other articles of lace, they cannot be regarded as appertaining to this branch of trade.

The Parasols exhibited (No. 432) are well manufactured, but are not in such good taste as those made in France; whilst at the same time they are dearer than similar goods sent by the English makers. The prices quoted vary from 20s. to 25s. each for plain parasols covered and lined with silk.

BRITISH COLONIES.

The richer contributions from the East Indies and the Island of Ceylon consist of State parasols or umbrellas, many splendid examples of which adorn the Indian Courts. The most remarkable example is the gorgeous State-umbrella from Moorshedabad, exhibited by his HIGHNESS THE MAHARAJAH OF NAGPOOR. This beautiful object is represented in the *Illustrated Catalogue*, page 924. The ribs and stretchers, which are gilt, are 16 in number, and divide the umbrella into as many segments, covered with silk exquisitely embroidered with gold and silver ornaments; the upper part of the design is complete in each compartment, but at the lower it is formed into a graceful running border, to which a fringe is fastened. The handle is hollow, and is formed of thick silver plates. Other examples contributed by his HIGHNESS THE RAJAH OF DHOLEPORE comprise the *Soorooj Mookee*, or native parasol, covered with rich damask silk, and having likewise a silver handle; and the gold umbrella with silver top and handle, and enriched with gold fringe. Of the more usual descriptions may be cited several specimens of Bengalee *Chattahs* or small umbrellas, conical in form; with manifold plaits and consequently ribs and stretchers; these chattahs are composed of the leaves of *Licuala peltata*, and are the description used by the poorer classes of natives of Bengal during the rainy season. Of the same class is an umbrella made in Gowhattee, of the same material, but used by the higher classes of natives in Assam. There is also a conical umbrella of painted and varnished cloth, made in Calcutta; and, as if to illustrate how difficult it is for the native taste to adapt

itself to European requirements, there is a very inferior imitation of an English umbrella, having ten ribs, covered with crimson calico, and lined and fringed with dark green: this umbrella, it appears, is generally used by Europeans throughout India.

CHINA.

In China the Umbrella is still a mark of high rank, but not exclusively so; it must not, however, be inferred that it is as commonly used amongst the middle classes of society as in England, as this is far from being the case, for it is not their custom to go out when it rains, and the poorer inhabitants of China depend chiefly on appropriate clothing to protect them from the sun and rain; for example, the Chinese boatman, thatched in with his coat made of straw, and hat composed of straw and split bamboo, may defy the heaviest shower. Coats made of skin, usually with the fur outside, likewise afford effectual protection, so that, unless the foot passenger desires to go short distances in his ordinary habiliments, the umbrella is unnecessary.* These remarks, taken from an entertaining paper in the *Penny Magazine*, Vol. IV., p. 479, entitled, "Umbrellas in the East," are evidence that the umbrella is not an article of such paramount importance in China as in England; and yet Umbrellas and Parasols are made in considerable numbers in the provinces of Kwang-tung, Fo-kien, and Hoo-kwang, and form an important branch of commerce. They are exported from Canton, Amoy, and Shanghai, to India, the Indian Archipelago, and even to South America; in 1846, 300,000 were sent out from these ports.† Almost all the parasols and umbrellas are covered with oiled paper, which is afterwards painted and varnished. At Canton umbrellas are termed *Kittysols*, from the Spanish word *quitasol*; the Chinese name is *Chi-yusan*, or *Yu-che*. Two examples only are exhibited in the Chinese Court; they are contributed by HEWETT and Co., but present nothing remarkable, beyond the great number of ribs which amount to forty-two. These ribs are formed of wood; and instead of being embraced by the fork of the stretcher, as is the case in European umbrellas, they have a groove cut in the middle of their length, into which the stretcher is secured by a stud of wood. The head of each rib fits into a notch formed in the ring of wood, which is fastened on to the top of the stick, there being a separate notch for each rib. The slider is of wood, and has forty-two notches, namely, one for each stretcher, which, like the ribs, is formed of wood. The covering of the umbrellas exhibited is of oiled paper coarsely painted.

FRANCE.

In the higher class of Umbrellas and Parasols, France undoubtedly stands pre-eminent. The tasteful designs and sharp and excellent carving of the ivory handles, and the artistic grouping of the colours of the various silks used in the manufacture of parasols, and the supple dressing of the silks for umbrellas,—give to the French manufactures a decided superiority; added to which, the frames were much lighter and neater than those made in England until a very recent period. The French parasols and umbrellas have, in consequence of their lightness

* In Alexander's *Costume of China*, Part 8, is a plate representing a group of Chinese, habited for rainy weather, which accords with this description.

† *Etude pratique du Commerce d'Exportation de la Chine*. Par Natalis Rondot. pp. 117, 118.

and elegance, acquired a high reputation in America and Italy, to which countries large quantities are annually exported, as well as to the French colonies. Taking an average of the annual exports of Silk Umbrellas and Parasols from 1827 to 1836 inclusive, their value was 36,360*l.*; between 1837 and 1846 it was 54,172*l.*; and in 1847 it had reached to 70,088*l.*; so that in 20 years the exports had nearly doubled in value. To obtain, however, the true exponent of the Annual Exports in Umbrellas, must be added the average value of the uncovered frames exported in the same years; in the first-named period it was 7,160*l.*, in the second, 9,160*l.*, and in 1847, 9,280*l.*; so that the value of the umbrellas, parasols, and frames which were exported in that year was 79,368*l.* Whilst the foreign trade of France has been rapidly increasing as regards silk umbrellas, she has lost ground in those covered with gingham, in which her trade was never large, owing to the competition of the English makers. Thus, from 1827 to 1836, the mean annual value of the Exports was 1,240*l.*; from 1837 to 1846 it was 960*l.*, and in 1847 it was reduced to 480*l.* According to the *Statistique de l'Industrie à Paris, Part II.*, p. 825, &c., it appears that in 1847 there were in Paris 377 masters engaged in the business of umbrella and parasol making, and employing 1,429 workpeople (601 men, 742 women, 45 boys, 31 girls); who, according to M. Natalis Rondot's estimate produced goods to the amount of 296,320*l.* in that year; not much more than one-fourth part of which was exported, as will be seen by comparing the foregoing figures. In 1850 the exports were somewhat less than in 1847; thus the value of the silk umbrellas and parasols was 57,380*l.*, of gingham umbrellas 89*l.*, of umbrella and parasol-frames 9,095*l.*, making a total of 66,564*l.*

Besides the umbrella mounters and finishers, there were in 1847 in Paris 74 manufacturers, employing 304 workpeople (264 men, 6 women, 34 boys), engaged in the production of sticks, handles, and tips; whose returns were 30,400*l.*

Of the 377 parasol and umbrella mounters and finishers,—

31	employed more than 10 workpeople.
163	„ from 2 to 10 „
122	„ - - - 1 assistant.
61	„ - - - no „
<u>377</u>	

9	produced goods to the value of	-	-	-	8,000
8	„ „	from	4,000	to	8,000
14	„ „	„	2,000	„	4,000
32	„ „	„	1,000	„	2,000
75	„ „	„	400	„	1,000
65	„ „	„	200	„	400
138	„ „	„	40	„	400
36	„ less than	-	-	-	40

Parasols and Umbrellas were formerly made by the corporate body of "*Bourriers*" (leather-purse-makers), who were at the same time breeches-makers, cap-makers, collar-makers, brace-makers, powder-puff—game-bag—and travelling-bag-makers. In 1754, says M. Natalis Rondot, there were 250 master purse-makers in Paris; and quoting the *Journal du Citoyen* of that date, he remarks, that folding parasols sold at from 12*s.* to 17*s.* 6*d.* each, and common parasols from 7*s.* 3*d.* to

11s. 3d. each. Two questions naturally suggest themselves—what was the form of these instruments, and what their weight? fortunately both questions can be answered satisfactorily. In the well-known French *Encyclopædias** there are plates representing the whole of the objects made by the “*Boursiers*” and the tools employed in their manufacture. The usual parasol or umbrella of that period which is there figured, closely resembles the ordinary gig-umbrella of the present day, and, slightly modified in form, is still used by the peasantry of France. The folding parasol was constructed with jointed ribs so as to fold back, and was likewise self-opening. The rod was a metallic tube, and contained a spiral spring which acted upon and pressed upwards an inner rod. To this inner rod were jointed the stretchers, which in this construction were placed above the ribs instead of below, as in the ordinary form; besides which they were much shorter so as to admit of their being concealed by the covering. By the elasticity of the spiral spring contained in the hollow stem, the inner rod was pressed outwards and lifted the stretchers, and by their means raised the ribs also, so that in its ordinary or natural state the umbrella was always open, and would continue so unless constrained to remain closed by a catch. On releasing the catch it consequently sprang open. In order that it might be easily closed, four cords were attached to four of the ribs and passed to the handle; and a loop embracing these cords passed down by the side of the handle, and enabled the possessor to close his umbrella without difficulty. From the authority already quoted we learn that whalebone was employed for the ribs, and that their number varied with their length: for example, when 24 inches long, the number employed was 8; when 25 inches, 9; and when 26, 28, and 30 inches, 10 were used. Calico was employed to cover umbrellas and silk to cover parasols. The use of parasols was common in Lyons at that period (1786)—they were carried by men as well as women; “they were rose-coloured, white, and of other colours, and were so light as to be carried without inconvenience.” In Vol. V. of the *Dictionnaire des Arts et Métiers*, published in 1788, and forming part of the *Encyclopédie Méthodique*, mention is made of parasols contained in walking-sticks, which fly out by the action of a spring as soon as a catch is released. The comparative “lightness” of Parasols may be judged of by the annexed statement, which relates to umbrellas of different periods from 1645 to 1849, contributed to the last French *Exposition* in the latter year by M. Farge—

Umbrella of	Length of ribs. Inches.	Weight. lbs. oz.
1645	31½	3 8½
1740	29	1 13
1780	28½	1 8½
1840	27½	0 13½
1849	27	0 8½

Hence it appears that the Umbrella of the present day weighs only one-seventh of that of a century ago. From 1808 to 1848, a period of 40 years, there were 80 Patents of invention, 3 of importation, and 41 for improvements relating to the Umbrella-trade taken out in France. Some of these are for mechanical con-

* Diderot and D'Alembert's *Encyclopédie ou Dictionnaire Raisonné des Sciences, des Arts et Métiers*. Paris, 1751-1765. Recueil des Planches, Tom. I. *Encyclopédie Méthodique*. Paris, 1782-1830. Section Arts et Métiers, vol. vi. (1786).

trivances allied to those before described; some are for improvements in the ordinary frames, and others for the adaptation of machinery as a substitute for hand-labour. With all this, the productions of France must be characterised as high in price, the ordinary wholesale price of a good silk-umbrella, of the self-opening construction, ranges from 20s. to 40s., and that of parasols from 13s. to 80s.; but then they are in every respect exquisitely finished. The French manufacturer is also famous for many ingenious contrivances: for example, with respect to Travelling-umbrellas which may be removed from the stick and packed in a portmanteau or placed in the pocket, and others too numerous to mention in detail.

PORTUGAL.

The Umbrellas in the Portuguese Department, Nos. 1127 to 1143, and the Parasols, Nos. 1144 to 1150, comprising about 30 varieties, are contributed by One Exhibitor, and may be characterised as creditable, though not remarkable, productions. The umbrellas are both with whalebone and steel ribs, covered with black silk, and have ivory and wood handles. The parasols are also made with metal frames, some for ladies', others for children's use, and are covered with plain and striped silks.

PRUSSIA.

The contributions from Prussia are from only One Exhibitor, and consist merely of Umbrella and Parasol handles, which are sold at low prices. In 1846 Prussia possessed Seventy-seven manufactories of umbrellas and parasols, which gave employment to Five hundred workpeople.

TUNIS.

The Tunisian Court contains many examples of Parasols, some of which are made of leather and silk, and others of silk adorned with ostrich feathers.

TURKEY.

Although we have not to cite any examples of umbrellas or parasols as having been sent from this country, yet, in treating of these articles, it is desirable to allude to the very prevalent employment of these useful shelters by the *middle-classes* of Turkey as a remarkable instance of the introduction of European customs into that country. So much, however, still remains of the regal attributes of the umbrella, that, in passing before the palace of the Sultan, the custom is to lower it; a compliment which the sentinel on duty does not fail to enforce from the foreigner who, unconscious of the forms of society, may happen to pass with his umbrella elevated.*

UNITED KINGDOM.

Whilst France stands pre-eminent for articles of the highest class, England is without a rival in the production of parasols and umbrellas of the plainer descriptions. This is to be attributed not so much to the introduction of new and expensive machinery (for it is still almost as simple as that figured a hundred

* *Penny Magazine*, vol. iv., p. 480.

years since in the French Encyclopædias before mentioned), as to the judicious subdivision of labour, and the importation *free of duty* of her colonial canes for the ribs and sticks; likewise whalebone for ribs, and lastly, *also free*, horn and ivory for the handles. Her cheap and abundant manufacture of gingham and plain silks, also gives her decided advantages over other nations.

It is not possible to determine with certainty the exact yearly produce in the parasol and umbrella trade which, for finished goods, is chiefly centred in London; but some idea may be formed of its importance when it is stated that several of the large city houses dispose of from 250 to 500 dozens of parasols and umbrellas weekly. The prices of the commoner kinds are marvellously low, as will be understood when it is stated, that children's gingham-parasols are sold wholesale from 4*d.* each, and women's from 10½*d.* each. Silk-parasols commence at 10½*d.* each, and gingham umbrellas at 7*d.* and 10*d.* each, according to the size. Alpaca-umbrellas range from 6*s.* to 12*s.* each, and silk-umbrellas from 3*s.* 6*d.* to 22*s.* each. To the price of the silk parasol there is scarcely an assignable limit, as any amount of expensive lace may be used to adorn it; the highest price quoted was 5*l.* 5*s.*, but the example was far less elegant than most of the specimens in the French Department, and much higher in price. Our umbrella-manufacturers would, indeed, do well to profit by the example of their French brethren, by calling artistic talent to their aid in devising new models. For there are many English artists who are capable of furnishing excellent designs for the ivory carver, and of superintending the carving of the first model; with whose aid we should gradually find *good engraving* taking the place of its present substitute *high-polish*, whilst the cost on each individual article would be very slightly increased. A little artistic help is likewise desirable in the assortment of harmonious tints; and, at the next Exhibition, there will be no examples of crimson parasols with yellow fringes.

We are indebted for the cheapness of the commoner umbrellas to three causes:—To the small cost of labour, attributable to the dexterity and industrious habits of the artisan; to the low price of gingham, which is sold at less than 3*d.* per yard; and to the employment of split-and-dyed ratan canes for the ribs in lieu of whalebone. M. Meyers (Class XXIX., No. 140) reports that his weekly sales of cane-ribs average 12,000 sets, eight to the set; the whole sale price of which is 10*d.* per dozen sets, or a little more than three farthings for each umbrella. Although ratan canes are used for some other purposes, the statement of the quantity imported into the United Kingdom, during the last ten years, will not be deemed out of place in the present Report.

RATAN CANES (not Ground-ratan).

Years.	Number Imported.	Number entered for Home-consumption.
1841	6,784,379	4,949,609
1842	4,101,369	4,687,757
1843	4,181,050	4,863,195
1844	8,145,757	8,293,984
1845	10,667,036	Free, and therefore no
1846	8,794,776	account taken.
1847	12,324,768	
1848	7,974,413	
1849	4,723,364	
1850	12,760,726	

A large quantity of whale-fins is likewise imported, and is consumed principally in the manufacture of umbrella-ribs.

Whale-fins Imported during the last Ten Years into the United Kingdom :—

Years.	Imported. Cwts.	Entered for Home-consumption. Cwts.
1841	6,369	6,272
1842	4,348	4,368
1843	6,609	6,297
1844	8,041	7,160
1845	11,484	Free, and therefore no account taken.
1846	9,101	
1847	8,128	
1848	7,765	
1849	8,926	
1850	9,498	

It has been previously stated, that one element of cheap production is the low price paid for labour. This position we now proceed to illustrate, first remarking that the putting-together of umbrella and parasol frames with cane and whalebone ribs, is chiefly done by small masters in London, who employ lads to assist them ; that the covering is performed by women and girls at their homes ; and that in the lowest-priced goods, the joint labour of an entire family is necessary to eke out a subsistence. The fixing of the handles and ferrules is often done at the warehouses.

In order that the reader may better appreciate the small amount of the wages paid for putting the frames together, the subjoined description of the various processes is given. The frame-maker requires a capital of from 3*l.* to 6*l.*, in order that he may erect a couple of very primitive-looking lathes with a circular saw ; a rose-cutter for forming the tips, and several drills, all of which screw into the mandrils of the lathes ; also a paring-knife, a small vice, and three or four pairs of pliers ; and lastly, a "weighing-board." The circular saw, rose-cutter, and paring-knife are comparatively modern improvements. He must rent a room or shop, and pay for fuel and candles. He has likewise to provide all the iron-wire and brass-plate out of what he receives in wages ; but the stick, ribs, stretchers, and runners are furnished to him. In order to work economically he must employ two lads, but he usually finds it more to his interest to employ four, to whom he pays 4*s.* per week.

1. *Preparing the Stick.*—The stick, which is usually of stained beech, is first sawn off to a length ; one end is tapered with the paring-knife to prepare it for receiving the ferrule ; two grooves are cut in with the circular-saw in the direction of the length of the stick, in order to receive the two springs, one for sustaining the umbrella open, and the other for keeping it closed. The springs are then made out of iron wire and fastened one in each groove, the fastening being effected by simply driving one end of the spring into the handle : the other is left free, but is prevented from flying out by means of a cross-wire, the insertion of which requires two operations, viz., drilling a hole and inserting and riveting the wire. A stopper is formed by bending a piece of wire like a staple, and it is then inserted into two holes drilled above the top spring in order to prevent the slider from going too far ; lastly two holes are drilled near the top of the stick, through these the cross-wire is inserted,

and when finished it presents the appearance of a double staple, one loop being on one side of the stick and one on the other. In preparing the stick it has passed at least *nineteen* times through the hand.

2. *Preparing the Ribs*.—Each rib is roughly tapered with the paring-knife at one end, and is rendered smooth and conical by holding it in the direction of its length in the groove of a wheel lined with fish-skin, which wheel is made to revolve rapidly in the lathe; the taper end of the rib is then held across a steel fly-cutter or “machine,” likewise running in the lathe, which cutter has a circular groove of the proper radius of curvature formed on its periphery. By rotating the rib in the hand, its “tip” is rendered spherical; the tip is then varnished and has a hole drilled in it to admit of fastening on the covering, and each rib is cut to the proper length by sawing off the opposite end: the “head” of the rib is lapped with thin brassplate and rounded, and is then drilled to admit of the “head-wire” on which it is afterwards hinged; the rib is lapped also near its centre with brass-plate, and drilled in order to admit of fastening on the stretcher; and lastly, the stretcher is attached by means of an axis of wire, the ends of which are riveted. Each rib passes not less than *thirteen* times through the hand; and, as there are eight ribs, the frame consequently passes *one hundred and four* times through the hand in this stage of the construction.

3. *“Weighing” the Ribs*.—Unless every rib be of equal strength the umbrella will not “set round,” hence the necessity for the “weighing” process. This operation is somewhat analogous to that which engineers employ in ascertaining the deflection of a beam, and is effected by a very simple instrument. The weighing-board is about 3 feet 6 inches long and 2 feet deep and is affixed to a wall, the longer side being parallel to the horizon; and there are in different parts of it a multitude of small holes for the reception of wire pegs. The rib to be weighed is placed over one peg close to its stretcher and under another peg, so far distant from the first as to reach nearly to the head of the rib; a small leaden weight is then hung on to the tip and of course deflects the rib, the amount of the deflection (indicated by graduations on the arc of a circle affixed to the board) gives the relative strength of the ribs, which are assorted out in sets accordingly. The weighing adds *eight* more operations to those already enumerated.

4. *“Threadling” the Ribs*.—Each stretcher, which it will be remembered is attached to the rib, is taken up in turn and threaded on to a wire, and is then inserted, each one in its respective place, in the notches of the slider, and all are made secure by hinding the wire round the top of the slider, which is grooved for that purpose. The head-wire is now inserted through four of the ribs, and is then passed through the two loops of the “cross wire” at the top of the stick; and now the four remaining ribs are threaded, and the head-wire secured by twisting its ends together with pliers. Reckoning that this adds *four* operations, the frame will have passed *one hundred and thirty-five* times through the hands of the workman or his assistants.

All this labour is performed for $\frac{1}{4}$ d. to $\frac{3}{4}$ d. in the case of parasols, and for $\frac{3}{4}$ d. to 1d. in that of umbrellas. A workman can, nevertheless, earn fair wages at these prices provided he is supplied regularly with work; but he is frequently subjected to much loss by being kept waiting about in the wholesale warehouses, which sometimes occasions a loss of at least half a day to him. The prices just

quoted are those paid for the lowest description of work, but for putting together the frame of an umbrella with whalebone-ribs, the workman gets 2½*d.* Of the cheaper kinds of umbrellas, say those at 1*s.* per dozen, a workman and four lads can make four gross per week, for which he receives 48*s.* After deducting the wages of his lads, 16*s.*, and the cost of the materials he supplies, which is about 8*s.*, it leaves him 24*s.* for himself.

Covering of Umbrellas.—This is paid for according to the description of work, the commonest at the rate of 1*s.* per dozen, and the best, 4*s.* per dozen.

The frames, which are made of metal, are almost exclusively manufactured in Birmingham. The stick, ribs, stretchers, and ferrule, are all metallic, and require, after covering, merely the insertion of a long wood or ivory handle and the ferrule to complete the umbrella. These frames can be furnished at from 7*d.* to 10*d.* each; and although not so cheap as the cane-frames, they are consumed and exported in enormous quantities, in consequence of the small bulk which they occupy. Many improvements have of late years been made, not only in the machinery used for making the metallic frames, but also in the construction of the frame itself. Amongst those most deserving of notice, may be cited the improvements of Mr. Holland and Mr. Boss. Either of their constructions adds about 2*s.* to the price of an umbrella. In conclusion, it may be stated that the umbrella-manufacture in the United Kingdom is in a very prosperous condition, and is rapidly increasing.

WURTEMBERG.

There are Four Exhibitors of Umbrella-handles from this country, the carving on some of which is very humorous: the most important collection has been rewarded for other ivory goods which were exhibited at the same time, and which formed the largest proportion of the contribution. (See Toys, p. 1527.)

The number of Exhibitors of Parasols and Umbrellas, or their components, such as handles, sticks, and mounted frames, is Thirty-three; of these, there are:—

5	Holders of a Prize Medal.
2	Who obtained Honourable Mention.
26	Unrewarded.

33

The number of Exhibitors from the various countries is as follows:—

Austria	-	-	-	-	-	-	-	5
Belgium	-	-	-	-	-	-	-	1
British Colonies (India and Ceylon)	-	-	-	-	-	-	-	2
China	-	-	-	-	-	-	-	1
France	-	-	-	-	-	-	-	3
Portugal	-	-	-	-	-	-	-	1
Prussia	-	-	-	-	-	-	-	1
Tunis	-	-	-	-	-	-	-	1
United Kingdom	-	-	-	-	-	-	-	14
Wurtemberg	-	-	-	-	-	-	-	4

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LIST OF AWARDS.

BOSS, ISAAC ABRAHAM, 6 Bury Street (Class XXIX., No. 146). Honourable Mention is accorded to this Exhibitor for several Mechanical Improvements in the construction of umbrella- and parasol-frames. One contrivance is to facilitate the opening of a parasol or umbrella. This is effected by means of a pin working in a groove close to the handle. The pin is fastened to a wire (contained in the hollow handle) acting on the ribs which overhang the joint so as to form short levers, so that by pulling the pin towards the handle the umbrella is opened. The price of the frames with this apparatus is 2s. 9d., one of ordinary construction being 10d.

CAZAL, — (France, No. 108). Prize Medal, for Parasols and Umbrellas elegant in form and of excellent workmanship. The carved ivory handles evince much taste and are well sculptured; the framing, which is very light, in many cases presents novelties of construction. The self-opening umbrella, for instance, may be cited as a very ingenious contrivance; the desired effect being produced by simply making each stretcher double, and so arranging the parts that a tension is put on one of the sets of stretchers in closing the umbrella, which consequently flies open as soon as a catch is released. A travelling-umbrella so arranged that the stick may be conveniently removed and used as a walking-stick, is also worthy of commendation. The prices of the umbrellas are, however, high, and range between 32s. and 100s. each. M. Cazal likewise exhibits Canes made of rhinoceros-horn, white whalebone, and conglomerated horn.

CHARAGEAT, E., Paris (France, No. 1144). Prize Medal, for Umbrellas and Parasols of first-rate workmanship. The designs and sculpturing of the handles are in all cases of the highest class. The case of this Exhibitor likewise contains numerous examples of ingenious mechanical contrivances, among which especially to be commended is an umbrella which closes of itself, when a spring near the handle is touched. The specimens, although equal in manufacture, and at the same time more moderate in price than those last mentioned, must still be considered as costly; umbrellas, for instance, range from 20s. to 60s., and parasols from 13s. (very plain) up to 80s. for the more elegant class, wholesale.

HOLLAND, HENRY, Birmingham (Class XXIX., No. 131). Prize Medal, for Parasol- and Umbrella-Frames of a novel construction, invented by him; the component parts of which are exhibited in various stages of progress so as to illustrate the plan of manufacture. This description of frame is distinguished from others chiefly in having ribs formed of rectangular steel-tubing, and is so light that when covered with strong silk to form an umbrella the whole instrument only weighs 9 ounces. This frame is now in very general use for the better description of umbrellas and parasols, to the cost of which it adds about 2s.

MORLAND, J., and SON, 50 Eastcheap (Class XXIX., No. 306). Prize Medal, for Parasols and Umbrellas of very excellent workmanship and at moderate prices. In the better class of goods, Holland's frames are employed. The umbrellas exhibited range in price from 3s. 6d. to 22s. wholesale, and the silk-parasols from 1s. 7d. (children's) up to 16s. each.

SANGSTER, WILLIAM and JOHN, 140 Regent Street (Class XXIX., No. 136). Prize Medal, for Silk Parasols and Umbrellas of excellent quality, and for their

application of Alpaca-cloth to the covering of parasols and umbrellas. Alpaca-cloth is made of the undyed wool of the Peruvian and Chilian sheep, and is therefore not liable to fade, nor is it acted upon by salt-water; hence Alpaca parasols and umbrellas are much used at watering-places, and are also largely employed as a cheap substitute for those covered with silk. Alpaca-parasols sell at 5s. each, and umbrellas at from 6s. to 8s. wholesale.

The consumption of Alpaca-cloth in the umbrella-trade, notwithstanding its recent introduction, is very considerable, for it appears that the production for this purpose amounted, during the last year, to the value of 25,000*l.*: its price is about 2s. per yard.

WIGDOR, M., Berlin (Prussia, No. 257). Honourable Mention. This Exhibitor contributes a great variety of Parasol- and Umbrella-handles manufactured from horn, bone, and ivory, which are deserving of Honourable Mention.

III.—WALKING-STICKS.

Whosoever the heroic period may be supposed to have existed, the staff, as employed for the support of old age, was then well known; since it is referred to in the enigma put forth by the Sphynx, and solved by *Œdipus*. "There is a Being," said the questioner, "which has four feet, and it has also three feet, with only one voice; but its feet vary, and when it has the most it is the weakest." "This is man," was the hero's answer, "who, when he is an infant, crawls upon his hands and knees; when he is a man, he walks uprightly; and when he is old, he totters with a stick."

The use of a staff for support in walking, appears to be so natural and inartificial, as not to require any illustration; and yet the Pilgrim's staff of the middle-ages, and the *Alpenstock* of the present time, have a certain amount of historical interest. The *Bourdon*, or *Pilgrim's* staff, was a strong and stout stick, apparently about five feet in length, armed at the lower end with an iron spike, and intended to supply a support and balance to the body, when the traveller was climbing up slippery paths or steep acclivities. About a foot from the top of the staff, was generally found a large protuberance, either artificially or naturally formed around the staff, on which the pilgrim's hand securely rested, without danger of sliding downwards. The lower part of the staff was altogether solid, but the upper joint was a hollow tube, capable of containing small articles, like a long circular box. It is probable that these articles were originally reliques of saints, or the "signs," as those emblematical figures were usually termed, which were commonly sold at the shrines to which pilgrims travelled, as proofs that they had really visited those sacred spots. In the later ages of pilgrimages, however, this part of the staff was sometimes converted into some kind of pipe or musical-instrument, such as sticks have frequently contained in modern times. Above the tube the staff was surmounted by a small hollow globe, and it was also furnished near the top on the outside with a kind of crook, for the purpose of safely sustaining a gourd-bottle of water. After the pilgrim had completed his votive journey, and returned from Palestine, he commonly brought with him a branch of palm, fastened into the top of his staff, as the proof of his travel into Palestine or Egypt. It is, however, unquestionable that the pilgrim's staff frequently became the recep-

tacle of secular articles. It is recorded by Holinshed, that in the hollow part of a pilgrim's staff the first head of saffron, afterwards so successfully cultivated at Saffron Walden, was secretly brought over from Greece, at a period when it was death to take the living plant out of the country. The silkworm also found its way to Europe in the hollow of a pilgrim's staff. So late, also, as the time of Cervantes, certain Spanish pilgrims existed, who had collected upwards of an hundred crowns in alms, which being changed into gold, they concealed in the hollow of their staves, or the patches of their clothing. It seems to be a natural observation in this place, that the ancient contrivance of making a repository in the hollow of a walking-stick is not yet obsolete. In the Great Exhibition, Dr. GRAY, of Perth, displayed a medical walking-staff, containing a variety of instruments and medicines; and the same principle has been also frequently employed for the portable conveyance of telescopes, instantaneous-light-apparatus, and many other important articles.

Several varieties of sticks were likewise exhibited, enclosing in them swords, dirks, and spring spears: the principle of construction of the sticks last mentioned being, that they required a heavy blow to be given with the armed end before the strong spring could be overcome which held back the spear-head. Sword-sticks, and dagger, or tuck-sticks, are of a more recent period; but this kind of weapon, walking-staves, is not of later invention than the last century; though that which contained fire-arms existed in the early part of the reign of Henry VIII.

The *Alpenstock* is another ordinary travelling-staff requiring to be noticed, of modern use, though of great antiquity. It is a stout pole of about six feet in length, provided with an iron spike at the lower end, and surmounted with a chamois' horn as an ornament. It is almost indispensable in mountain journeys, and may be procured for two francs throughout Switzerland.

Another order of Walking-sticks comprises those light wands to which the name is now exclusively attributed; and these also are descended from a time of considerable antiquity. The stem of the giant-fennel, the *Ferula* of Pliny, is the chief progenitor of this family, and he derives the origin of the name of the plant either from *fero*, from the stalk being employed in walking; or from *ferio*, because schoolmasters used it for striking boys on the hand. It would seem as if the latter interpretation had become established at an early period, since Martial terms the *ferula*, *sceptrum pedagogorum*; and even down to the present day the word popularly conveys no other meaning. The tough lightness of the fennel-wood rendered it especially fitted for a support to aged persons; whilst the imposing length of the staff gave an air of importance to those who carried it. Hence it became the prototype of those lighter wands which have continued as the sign of seniority or gentility to the present time.

In Oriental countries the substitute for the *ferula* was naturally some kind of native reed; and the employment of such a plant as a support, and also as an emblem of Egypt, is noticed, in probably a proverbial form, by the Assyrian general, Rabshakeh, in his speech to the servants of Hezekiah, in the eighth century B.C. "Now behold," says he, "thou trusteth upon the staff of this bruised reed, even upon Egypt; on which, if a man lean, it will go into his hand and pierce it." (2 *Kings*, xviii. 21.) The supposition that the *ferula* was supplied by some local plant must be also equally true concerning other regions, and especially in those

in which the bamboo was indigenous. This was probably the first kind of the cane tribe introduced into Europe; since the word cane in all its original forms appears intended to express a hollow tube or channel, for which purpose the bamboo is still extensively and constantly employed. Although the generic name of cane has long since supplanted all others for ordinary walking-sticks, yet at different periods they have been made of a great variety of materials. A slight glance may be taken at some of the substances employed, and some of the peculiarities of the common walking-sticks of other times.

In the Egyptian sculptures persons of importance or official rank are represented walking with tall slender staves, having the lotus-flower on the tops. Several ancient specimens of these sticks have been discovered in Egypt, made of cherry-wood and other substances, measuring from three to four feet in length, some being surmounted by a small knob or a flower, and others having a curved projection standing out on one side, like the tusk of a bear, as if it had been intended for the hand to rest upon.

At a very early period of the Sacred history the distinctive character of the staff carried by an individual is indicated from his immediate recognition simply by the production of it with his signet and his bracelets (*Genesis* xxxviii. 18-25). Homer has commemorated the "sceptre-bearing princes" of the Greeks, and especially the sceptre-staff of Achilles, adorned with golden studs: "I will swear a great oath," says the hero, "even by this sceptre, which shall never again bear leaves or shoots, nor will bud again from the time it left its trunk upon the mountains, when the axe stripped it of all its leaves and bark." These sceptres, although they were undisputably the insignia of rank and authority, were also evidently the usual walking-sticks of persons of the highest class. Agamemnon, it is stated, never went forth without bearing with him his paternal staff of royalty.

In the portraits of many of the noble personages of English history, painted in the sixteenth century, may be seen instances of the richness of the superior walking-sticks carried at that period, when they appear to have been tall, stout, and mounted and adorned with gold. In 1531 a cane-staff and a stone-bow were brought as a gift to Henry VIII. by a certain fletcher or arrow-maker, whom the king rewarded with forty shillings. Some far more curious instances of canes belonging to the same sovereign are, however, described in the manuscript inventory of the contents of the royal palace at Greenwich, in the following entries:—"A cane garnished with sylver and gilte, with Astronomie upon it. A cane garnished with golde having a perfume in the toppe; under that a diall, with a pair of twichers and a pair of compasses of golde; and a foot rule of golde, a knife and a file of golde, with a whetstone tipped with golde."*

From the middle of the seventeenth century walking-sticks appear to have increased in luxury, both in regard of the mountings and also of the material of which they were manufactured, the improvements being derived principally from France. In the early part of the following century, the most fashionable sorts were made of certain fine marbles and agates, exhibiting either a splendid variety of colour or a rich semi-opaque plain tint, which was most expressively described by the English term "Clouded." These wands were made of the most slender pro-

* *Costume in England*, by F. W. Fairholt, p. 473.

portions, both on account of their specific gravity and the quality of the persons by whom they were to be carried; and they were often richly mounted with silver, gold, amber, or precious stones. Such were the "clouded canes" of the age of Pope and Gay, which were frequently so greatly valued as to be preserved in cases of shagreen or sheaths of leather. Every reader of "The Rape of the Lock" will remember—

"Sir Plume, of amber snuff-box justly vain,
And the nice conduct of a clouded cane;"

as well as Gay's commemoration of the same kind of walking-stick in "The Van":—

"Here clouded canes, 'midst heaps of toys are found,
And inlaid tweezer-cases strew the ground."

The most curious account of the walking-sticks of this period is, however, contained in the "Tatler," No. 103, written by Addison and Steele, and published on Tuesday, 6th December 1709. In that paper Isaac Bickerstaff represents himself as issuing licences and regulations for the beaux of the time, as to the carrying of "canes, perspective glasses, orange-flower waters, and the like ornaments of life." The first part of the essay is intended to ridicule and abolish the prevailing absurd though fashionable practices connected with walking-sticks; hence the respective parties were licensed to carry them provided they did not walk with them under the arm, nor brandish them in the air, nor hang them on a button. One of the petitioners desires permission to retain his cane, because it had become as indispensable to him "as any other of his limbs," and because "the knocking of it upon his shoe, leaning one leg upon it, or whistling upon it with his mouth, are such great reliefs to him in conversation, that he does not know how he should be good company without it." The cane of this person being produced, it is described to be "very curiously clouded, with a transparent amber-head, and a blue riband to hang it on his wrist."

In the second half of the last century there was one peculiar form of walking-stick prevailing, which was generally used by females who were advanced in life. The sticks referred to were between five and six feet in height, taper, and slender in substance, turned over at the upper end in the manner of a shepherd's crook, and twisted throughout the whole extent of the wand. The materials were either wood, ivory, or whalebone, mounted with silver or gold, and sometimes they were formed entirely of a clear pale green glass. The length of the most fashionable sticks of this period is noticed in a number of *The London Chronicle*, published in 1762, wherein the writer says, "Do not some of us strut about with walking-sticks as long as hickory poles, or else with a yard of varnished cane scraped taper, and bound at one end with waxed thread, and the other tipped with a neat ivory-head as big as a silver penny?" Towards the close of the eighteenth century two peculiar forms of walking-sticks were commonly carried by the most gay of the young men of the period, one being a very short and strong bamboo-cane, bent over at the top, and the other a stout knotted stick, in which the grotesque natural growth of the wood was frequently regarded as its greatest excellence.

Another kind of Walking-sticks comprises those grotesque staves which have been devised or adopted by individual fancy or eccentricity. It is possible that

this peculiar humour may be of considerable antiquity, since the knotted walking-staff and wallet were the distinctive attributes of the Greek and Roman philosophers, and especially of the cynics. The chief peculiarity of this class of staves, however, consists in an ingenious adaptation of the excrescences of the wood of which they were made, into grotesque human heads and faces, of which the Exhibition contained many curious and remarkable instances. The old English form of these staves may perhaps be referred to the baubles carried by the fools and jesters who were retained by sovereigns and noblemen in the sixteenth and seventeenth centuries. The Jester's Bauble consisted of a short stout staff surmounted by the carved figure of a puppet or a fool's head; and the modern practice of carrying sticks decorated with humorous faces appears to have existed early in the eighteenth century. About 1730 *The Universal Spectator* states, that at the court end of the town, instead of swords, many polite young gentlemen "carry large oak sticks, with great heads and ugly faces carved thereon." Perhaps some of the most remarkable instances of these carved sticks ever exhibited, were those executed and carried about by James Robertson of Kin-craigie, otherwise called "the daft Highlaud laird," of whom Kay published an etching in 1784. In the latter part of his life he adopted the amusement of carving, for which he had some talent, and sculptured in wood the effigies of such persons as attracted his wayward imagination, whether friends or enemies; the latter, however, being executed in caricature. These small figures he mounted on the upper end of a walking-stick, sometimes one above another; and as it was reported that he produced a new one every day, he was commonly accosted with the inquiry "Wha hae ye up the day, laird?" to which he would readily answer, by naming the individual and the reason for selecting him.*

It might be supposed that the Manufacture of Walking-sticks could not form a large branch of commerce, and yet a vast quantity and great variety of materials are annually consumed in it. There is scarcely a grass or a tree of sufficient elasticity or strength, which has not at times furnished the materials for a staff or a walking-stick. The stick-maker, however, gives a decided preference to some few kinds out of the almost infinite variety offered to him by nature. Amongst European woods the Blackthorn, the Crab, especially the Warted-crab, the Maple, the Ash, the Oak, especially the young or sapling oak—the Beech, the Orange-tree, the Cherry-tree, the Furze-bush, the Cork-tree, and the Spanish Reed (a grass called *Arundo donax*), are those principally used; and these woods are most generally cut towards the latter end of Autumn, especially when it is wished to preserve the bark. The West Indies furnish a copious supply of the most approved materials for walking-sticks, in Supple-jacks (vine-stems), Pimentos (from the *Eugenia pimento*, or pepper-tree), Cabbage-stalks, Orange and Lemon-tree sticks, and the Coffee-shrub and Indian briars. Numerous canes, the produce of climbing palms and gigantic grasses, are also largely used by the stick-maker. The principal of these are the following:—Rutans, Dragons, and Penang-lawyers, which are the stems of a species of *Calamus* or climbing-palm, and are obtained from India, Singapore, Java, and China—White and black

* Biographical Sketches attached to Kay's *Edinburgh Portraits*. Part I.

Bamboos, Fluted-bamboos, Whangees, Jambees,* and Doghead canes, which are the stems of various species of bambusa or grasses attaining a height of from 50 to 60 feet, and are exported from China; Ground-ratans, large Ground-ratans, Malaccas and Dragons from Singapore. There are also the Bamboo and Jungle-bamboo imported from Calcutta; and, lastly, Canes from Manilla.

It must not be supposed that these various materials, in the unwrought state, present an appearance at all resembling the finished sticks. Indeed the copious examples in the North-East Gallery (XXIX. 140) fully confirm this statement; but the truth is much more strongly impressed on the mind after an inspection of the immense warehouses of Mr. B. Meyers, who contributed them. Those repositories appear at first sight to contain stores of little value above that of fire-wood; yet many thousands of pounds have thus to be locked up for a time, in order that the various woods may become properly seasoned. It is only, indeed, after having passed about twenty times through the hand that even the commonest walking-stick assumes a saleable appearance; and the better descriptions require many more operations. The principal processes of this manufacture deserve to be described.

1. *Peeling off the Bark*.—From most of the forest-woods the bark has to be removed before the separated boughs can be made into polished sticks; but in some cases it is left on. One of the most difficult articles to manipulate is the warted crab, the excrescences of which are produced by an abnormal growth of the tree, resulting from the puncture of an insect. As a halfpenny is the payment for peeling one of the most complicated kind, it will be readily concluded that there must be some simple means of facilitating this operation; and accordingly the sticks are boiled for a couple of hours; the bark then yields to the incision of the finger-nail and may be stripped off without difficulty.

2. *Forming the Crook and Straightening the Stick*.—Few limbs of trees or even canes, are sufficiently straight in their natural condition to answer the purpose of a walking-stick, and very few present those conformations which can be readily fashioned into handles; hence the necessity for these two operations, which claim our admiration from their ingenious simplicity. The handle is formed by softening the wood or cane in hot *damp* sand, when it becomes pliable and non-elastic, and readily assumes and retains any curvature or bend that may be given to it. Minute attention, however, is required with regard to the temperature for each description of wood; hence the precise degree which is proper for each can only be learned by long experience; and in cases where a new variety of material is imported, some experimenting becomes necessary. The straightening is performed in a similar manner, excepting that the previous softening is effected in *dry* sand heated on an iron plate, that is in the ordinary sand-bath. When the stick has become sufficiently pliable, it is inserted into a deep notch cut in the edge of a strong plank, and is strained first in one direction and then in another until it has become straight. The stick when softened takes any form, much as a piece of red-hot iron would do. The straightening-plank is three inches thick, about six feet long,

* The relative fashionable value of some of these sorts of cane is satirised in *The Tatler*, No. 112, published on Tuesday, March 7, 1709-10. In that paper, "a plain dragon" is charged at five guineas, and "a true jambee" at ten.

and one foot wide, and is inclined away from the workman at an angle of about 30° from the perpendicular, it being firmly secured to the floor at the lower end.

3. *Fashioning the Stick.*—In this operation some sticks are wrought to assume a twisted or spiral form, and others the knotted appearance of a bamboo or whangee: these characteristics are imparted chiefly by rasping and filing. Heads or hoofs of various animals very commonly adorn stick-heads, and grotesque human heads frequently display proofs of considerable skill and surprising humour in the artisans employed. Examples of this latter description were exhibited in Class XXIX., No. 140; and by most of the German and Austrian Exhibitors.

4. *Staining.*—After straightening or carving, the sticks are in many instances brought to a very smooth surface by means of emery or glass-paper, and finished off with fish-skin; and they are then, previously to the varnishing, made to assume so many different hues by means of dyes, that the uninitiated would conclude that each was a perfectly distinct variety. The surface is likewise sometimes charred, and the charred portion scraped off partially here and there, so as to produce a very ornamental appearance. Sticks are also embellished with lithographic-transfers, but not in England, as hand-labour is too expensive. Malacca-canes, when not sufficiently long between the joints to form a straight stick, are made to appear continuous by reducing the larger part to correspond to the smaller, and tapering it gradually from the point of juncture. It then becomes necessary to colour that portion which has been reduced in size, and this is done with so much skill, that the stained and natural surfaces are not distinguishable.

Hitherto, mention has been chiefly made of sticks of vegetable origin. Of such as are made of animal substances may be instanced whalebone, tortoiseshell, ram's horn, rhinoceros' horn and hide, as commonly employed for sticks; and occasionally the real bone of the whale, the spine of the shark, the horn of the narwhal, and ivory. The horns of animals, under particular treatment with heat and by mechanical appliances, are drawn out into long cylinders; and tortoiseshell raspings are easily conglomerated by heat and pressure, and in the soft state formed into elongated rods applicable to the manufacture of sticks. The hide of the rhinoceros forms a very transparent horn-like substance, and is very elastic and tough. The feet of fawns, which are frequently used for stick-handles, are made to retain the required form by merely baking them. Ivory, horn, and bone, are also largely used for stick and umbrella-handles, and give, in their preparation for these purposes, employment to a considerable number of workmen.

Metals are not much used in the formation of the entire stick, but are restricted chiefly to the handles and ferrules; still, however, iron sticks painted to represent wood and cane are not unusual.

Ratan, or common canes, although used for sticks, are more frequently employed as a substitute for whalebone by milliners, stay-makers, and umbrella-makers. For the first two uses they are merely split by hand to the required size. They are also used for chair bottoms, and are then previously bleached by the vapours from burning sulphur (sulphurous acid). For umbrella-ribs the canes are first assorted into sizes by lads. They are then cut into various lengths, ranging from 10 inches to 30 inches by means of a hand-saw, a gauge-board being used to facilitate the operation. After this, three sides are removed by means of a plane,

the cane being held at one end by a vice and resting throughout its length on a plank. The ribs are subsequently dyed by boiling with logwood and copperas (sulphate of protoxide of iron), and dried thoroughly after this operation in a drying-room heated to a high temperature with a stove. Lastly, the excess of dye, a sort of crust, is removed by rubbing the ribs with a piece of waxed-cloth, by which they become polished, and they are then set straight by straining them in a cold state.

Before proceeding with the review of the contributions of the several nations, attention is claimed to the fact that London, Hamburg, Berlin, and Vienna, are the chief seats of the manufacture under consideration, and that by a curious coincidence the principal maker in three of those cities bears the name of Meyer or Meyers. Two of them, namely, those residing in London and Hamburg, are present by their works in the Great Exhibition; but the third, of Vienna, does not exhibit.

AUSTRIA.

The display of Walking-sticks in the Austrian section is very extensive, and has been contributed principally by two stick-makers; and also by a manufacturer of pipe-tubes, who has been rewarded chiefly for the latter article (see PIPES, p. 1505). Although the Two other Exhibitors have not received any Award, their contributions are deserving of favourable mention from their extent, cheapness, and goodness of workmanship. The largest exhibitor is A. TAUTZ (No. 685), who sends a very extensive collection of sticks, from 9*d.* to several pounds each. They comprise most of the known varieties, and are generally ornamented with ivory-handles, which, although not remarkable for any great correctness of form, are very well executed and very elaborate, and many of them are exceedingly humorous. Taking the amount of work into consideration, the goods of this maker are generally low in price. The Exhibitor next in importance is T. LUDWIG (No. 679), who has contributed walking-sticks from 1*s.* each, but not ranging to prices so high as those sent by the maker already mentioned. His contributions are remarkable for their cheapness wherever much hand-carving is displayed.

BELGIUM.

The Walking-sticks in the Belgium Department are contributed by One Exhibitor from Bruges (No. 416), and consisted entirely of a description ornamented with inlaying, which is well executed.

BRITISH COLONIES.

The Exhibitors of Walking-sticks from the various dependencies of Great Britain are very numerous, and their contributions highly interesting, from the variety of materials employed in their formation; none, however, can be considered in any way as representing the art of stick-making in a commercial sense. From *Western Africa* is a stick, or Staff of Honour, usually carried before the African chiefs. Besides this, which was sent by Dr. Mc WILLIAM, are several sticks from the Horn of the Rhinoceros, contributed by Mr. HANBURY, and a stained Quina walking-stick from the GROENKLOOF MISSIONARY STATION.

From *South Africa* Mr. BRIDGES has sent some sticks of Rhinoceros-hide. *British Guiana* is represented by Two Exhibitors, Mr. BEE and Mr. DUGGIN; the first of whom has sent a walking-stick made of the outer part or rind of the Tooroo palm from the River Demerara, and the second one made of a tree called Letter-wood. From the *Eastern Archipelago* are Ratans and Bamboos contributed by P. HAMMOND and Co. The *Indian Courts* contain some very interesting specimens of decorated sticks, as they do of most of the ornamental arts; they are contributed by four Exhibitors, beside the HONOURABLE EAST INDIA COMPANY. The specimens at present to be noticed consist of four bamboo walking-sticks, richly mounted in gold and silver, sent from the RAJAH of ULWAR; a stick enriched with a painted ornament, and mounted with silver, contributed by the RAJAH of KISNAGHUR; sandal-wood and carved ivory *Chowrees*, or Whisks, from the RAJAH of BHURTPORE; an Ivory walking-stick, with a gold ring; two Ivory Chowrees, one from Jodhpore, the other from Bhurtpore; and two Chowrees, made of the tail of the Yak (*Bos Grunniens*), with silver handles. There is also a selection of walking-sticks of various descriptions, made at Calcutta, and in Cochin China; Betel nut-sticks and a Sandal-wood Whisk from Calcutta. Most of these beautiful and interesting articles were purchased by the Company for the purpose of the Exhibition. The small collection from the *Island of St. Vincent* consists principally of specimens of Snapple-jacks; and from *Trinidad* is a walking stick sent by the Governor, LORD HARRIS. From *Van Diemen's Land* are two contributions of walking-sticks, made with the hard portion of the bone of the whale, with heads carved out of the whale's tooth, one being sent by Sir W. T. DENISON, and the other by Mr. T. SCREEN; and there is also a stick made of the oak of Tasmania (*Casuarina quadrivalvis*), contributed by the Venerable Archdeacon MARRIOTT.

CHINA.

In the Chinese Court is a Bamboo walking-stick, curiously carved which was contributed by Mr. F. S. CARPENTER, in addition to which may be mentioned two Chinese sceptres, one from HER MAJESTY'S CONSUL AT SHANGHAE, and a still more interesting and elaborately carved specimen contributed by Mr. P. P. THOMS, of Warwick Square, a full description of which will be found in the *Illustrated Catalogue*. It would appear from Mr. Thom's account, that it dates from 2169 years B.C. These specimens, however, must be regarded as mere curiosities, and in no way representing the commerce of China in this branch of trade, which as regards the raw material is very important, large quantities being annually exported. From Canton alone 1,200,000 sticks of various kinds were exported in 1846, consisting chiefly of different kinds of canes and bamboos, but comprising also laurel-sticks, stems of the tea-plant, and the root of the fig-tree of the Pagodas (*Ficus indica*).

FRANCE.

The French Department contains some very elegant examples of Walking-sticks, which have been sent principally by an Exhibitor noticed in the List of Awards; but specimens were also exhibited by umbrella-manufacturers, who have been spoken of in the preceding article. Indeed many of the umbrella-manufacturers of France are also makers of walking-sticks and riding-whips. France does not export a very

large quantity of walking-sticks, on account of the far less cost of production in London and Hamburg of the ordinary descriptions, and in Vienna of those with elaborately carved handles. The chief specimens sent by the French stick-makers, and also by the umbrella-makers, consist generally of articles made of elongated ram's horn and conglomerated tortoiseshell. In 1847 there were, in Paris, One hundred and sixty-five manufacturers of walking-sticks, and riding and driving-whips, employing Nine hundred and sixty-two workpeople, who produced goods valued at 140,320*l*. The journeyman, who in Paris works by the piece, earns from 2*s*. 10*d*. to 4*s*. 10*d*. per day; and a skilful engraver or enchaner about 7*s*. 3*d*. per day. The workwomen earn from 1*s*. 2*d*. to 1*s*. 10*d*. per day. M. Natalis Rondot quotes 12,000*l*. as the annual value of the productions of the largest manufacturer in Paris; but this estimate comprises also riding and driving whips. About nine-tenths of his articles are exported.

The imports of bamboo-canes into France are as follow:—

	Bamboes and Large Canes.	Bambs and other Small Canes.
	Cwt.	Cwt.
1830	146	126
1835	254	468
1840	610	1,820
1845	828	4,120
1850	950	3,606

HAMBURG.

The most important display of Walking-sticks is undoubtedly that in the Hamburg Department, contributed by H. C. MEYER, jun., who, it appears, is the most extensive stick-maker in the world. His collection contains about five hundred varieties, comprising most of the known materials. This Exhibitor, who in Hamburg employs between Two and Three hundred workpeople, has also a branch-establishment in New York. There is also a small collection from another Exhibitor of Hamburg, which, being a free port, possesses an almost equal advantage with London in regard to obtaining materials free of duty, and is generally a large purchaser at the Colonial sales in London of all the productions obtained from the British dependencies. Being placed on an equality in this respect, Hamburg has another great advantage in the cheapness of hand-labour over London, and is consequently a most powerful rival in the manufacture of sticks.

HESSE.

From the GRAND DUCHY OF HESSE is contributed a collection of sticks, ornamented with transfers from paper, printed by lithography, and which are produced at so low a price as to defy the competition of Hamburg or London. Large quantities of these very neat productions, imitative generally of sticks covered with plait, are annually exported to England and America.

PRUSSIA.

There is One Exhibitor who sends good articles from Essen.

SARDINIA.

There is One Exhibitor of beautifully finished plain sticks, which, although comprising few varieties, are very meritorious.

SWITZERLAND

sends a gold stick-head with internal mechanism.

TUSCANY.

The contributions from Tuscany consist of Five Walking-sticks, composed of numerous pieces of horn, with handles of gilt bronze.

UNITED KINGDOM.

The manufacture of sticks in England is in an increasing and most flourishing condition; for not only are the goods for home-consumption chiefly made in this country, but Great Britain also possesses a very large export-trade in the finished article, and almost exclusively supplies the Continent with the raw material with which her markets are abundantly furnished from all parts of the world. To give some idea of the extent of the trade, it may be stated that the principal London maker prepares annually 80,000 bundles, which are equal to 2,500,000 ratans, principally for parasol and umbrella ribs; and he also sells annually the subjoined quantities of manufactured sticks, viz.:—

Partridge canes	-	-	-	-	-	-	-	-	60,000
Bamboo canes	-	-	-	-	-	-	-	-	80,000
Malacca canes	-	-	-	-	-	-	-	-	110,000
Dragon canes	-	-	-	-	-	-	-	-	100,000
Ground ratans	-	-	-	-	-	-	-	-	15,000
English sticks, such as oak, ash, crab, maple, &c.	-	-	-	-	-	-	-	-	144,000

Polished Ash-sticks are chiefly manufactured at Birmingham, where they are sawn out by machinery, and subsequently turned and polished. At present the English maker is unable to compete with the German manufacturer in producing sticks ornamented with transfers from printed papers, but probably the substitution of letterpress for lithographic printing would turn the scale in favour of England.

The importation of walking-sticks is, however, very small, as will be seen from the following table:—

Value of the IMPORTS into the UNITED KINGDOM, of Manufactured Walking-sticks in 1850.

									£.
From the Hanseatic Towns	-	-	-	-	-	-	-	-	792
" Holland	-	-	-	-	-	-	-	-	450
" France	-	-	-	-	-	-	-	-	269
" Other Parts	-	-	-	-	-	-	-	-	93
From all Parts	-	-	-	-	-	-	-	-	<u>1,604</u>

Whalebone-sticks are made better and cheaper in Germany, and the continental makers are also more proficient in making sticks from the hide of the rhinoceros;

but as regards those ornamented with silver wire, England is unrivalled, and holds a high position with regard to the chased silver and gilt handles; indeed the ferrules and metal-work generally are unsurpassed. The same remark which was made with respect to umbrella, here applies to the carved ivory stick-handles: the fault appears to consist in choosing subjects which cannot be well executed at such prices as can be afforded for the carving.

The following wholesale prices will give some idea of the value of the different kind of Sticks of British manufacture, though not a very accurate one, without at the same time seeing the samples:—

Polished Ash sticks-	-	3s.	per doz. to	6s. per doz.
Bamboos	-	2s. 6d.	" to	6s. "
Partridge	-	6s.	" to	18s. "
Whangoe	-	4s.	" to	48s. "
Malacca	-	4s.	" to	40s. each.
Beech, with crutch handles,	12s.	"	to	18s. per doz.
Canes, with loaded heads	10s.	"		
Sword-sticks	-	7s. 6d.	" to	12s. each.

Walking-sticks are sent by Thirteen Exhibitors, whose productions are dispersed in various divisions, as, for example, in Classes VIII., X., XVI., XXII., and XXIX. These specimens comprise many instances of the employment of walking-sticks for containing various implements, alluded to in the introductory matter. Beside the instances there quoted, are to be found—a walking-stick which serves the purpose of a miniature wine-cellar and larder (Class XVI., No. 81); one which contains a voltaic-battery (Class X., No. 423), which continually subjects the owner to an electric current; one (Class XXIX., No. 183) to contain guide-maps, and two or three others convertible into seats, umbrellas, and other instruments.

UNITED STATES.

The United States are represented by One Contributor, who exhibits a gold-headed walking-stick, made from the Curled-hickory.

WURTEMBERG.

Beside One manufacturer, who exhibits sticks to some extent, Three Contributors send stick- and umbrella-handles, with other articles in ivory, one of whom has obtained a Prize Medal, to be alluded to under the article Toys.

Beside those who exhibit walking-sticks, with articles discussed in other portions of this Report, there are Forty-six Exhibitors of Walking-sticks only, or principally; of these, there are:—

5	Holders of a Prize Medal.
3	Who obtained Honourable Mention.
38	Unrewarded.
46	Total.

The number of Exhibitors from the various countries is as follows:—

Austria - - - - -	2	France - - - - -	1
Belgium - - - - -	1	Hamburg - - - - -	2
British Colonies:—		Hesse - - - - -	1
Guiana - - - - -	2	Prussia - - - - -	1
Eastern Archipelago - - -	1	Sardinia - - - - -	1
East Indies - - - - -	5	Switzerland - - - -	1
South Africa - - - - -	1	Tuscany - - - - -	1
St. Vincent - - - - -	1	United Kingdom - -	13
Trinidad - - - - -	1	United States - - -	1
Van Diemen's Land - - -	3	Wurtemberg - - - -	1
Western Africa - - - -	3		
China - - - - -	3	Total - - - - -	46

LIST OF AWARDS.

BAGRÉ, — (France, No. 1123). Honourable Mention is accorded for a collection of Walking-sticks made of Ram's-horn and Tortoiseshell.

CIAUDO, JOSEPH (Sardinia, No. 68). Prize Medal, for a collection of well-manufactured Walking-sticks, comprising several varieties of wood.

FRANK, J. G., Offenbach (Grand Duchy of Hesse, No. 61). Honourable Mention is accorded for a large collection of well-made and very cheap Walking-canes, which are ornamented with tartan and other patterns, transferred from lithographic impressions on paper, and then highly varnished; and also for papier-maché Snuff-boxes.

HEDINGER, C., Stuttgart (Wurtemberg, No. 92). Prize Medal, for a collection of Malacca walking-sticks, Partridge walking-canes, Umbrella- and Parasol-sticks, and some few Umbrella-frames. The goods exhibited are well made, and at very reasonable prices.

MEYER, H. C., jun. (Hamburg, No. 86). Prize Medal, for a most extensive assortment of excellent Walking-sticks, Sword-sticks, and Dart-sticks, the mounts of which are, in most cases, tastefully designed and well executed. The collection comprises also Split-whalebone, plain and fluted, which is used for covering sticks, whips, opera-glasses, and telescopes.

MEYERS, BARNETT, 18 Crutchard Friars (Class XXIX., No. 140). Prize Medal, for a very large and interesting collection of canes and sticks of various descriptions, in the raw state, which comprises all the principal varieties. Also Parasol and Umbrella-ribs of dyed ratan; Cane-ribs for milliners, cap-makers, whip-makers, and chair-makers, together with an excellent collection of highly-finished Walking-canes, Sword-sticks, and Dart-sticks, the mounts of which are good in design, and of the best class of workmanship.

SCHULZ, C., Essen (Prussia, No. 593). Prize Medal, for a collection of well-made Walking-sticks and Sword-canes, which are well manufactured, and are sold at reasonable prices.

TONTI, L., Florence (Tuscany, No. 102). Honourable Mention, for a collection of Walking-canes composed of numerous pieces of horn of different tints.

IV.—FANS.

Upwards of 3,000 years ago the artist of ancient Egypt painted the fan on the walls of the tombs at Thebes. There the Pharaoh sits surrounded by his fan-bearers, each in his due rank; and there is seen an investiture of a fan-bearer, which realizes the description in *Genesis* of the honours paid by Pharaoh to Joseph. The office of fan-bearer must have been honourable; and the insignia of office were long, slender, vividly-coloured fans on variegated or twisted handles: in war the same officers acted as generals or marshals, using their fans as standards; and in peace they assisted the Pharaoh in the temple, and waved their variegated fans both to produce a cooling breeze, and to guard the sacred offerings from the contamination of noxious insects.

The Fan is mentioned by Euripides, and its origin from "harharous countries;" its use in Greece was similar to that in Egypt, but its forms were far more beautiful. The wings of a bird joined laterally and attached to a slender handle formed the simple yet graceful fan of the Priest of Isis, when Isis became a Grecian deity; but it had not this form alone, for the Greek vases of Sir W. Hamilton show that feathers of different lengths were taken and spread out somewhat in the form of a semicircle, but pointed at the top; a thread connected the feathers at their base, and another near their summit, and the fan thus made was fixed in a handle. This fan, the precise type of the State-fan of India and China of the present day, was waved by a female slave.

The Fan, according to Virgil and Apuleius, was sacred to Bacchus, and the "*mystica Vannus Iacchi*" was carried in procession in the feast of that deity, as well as in the Eleusinian Mysteries. Its appellations multiplied, though its office remained the same, and it was termed indifferently "*Flabellum*" or "*Muscarium*."

The modern Greek church is careful to place a fan in the hands of its deacons, to guard the officiating priest and the elements from desecration.

The Roman ladies certainly enjoyed the luxury of the fan, which, gorgeous with peacock's feathers, or delicate with the tinted plumes of the ostrich, could not yet be folded, and rendered the services of an attendant necessary.

In the works of the middle ages references are made to the two forms of the fan, to that employed for winnowing the grain, and that used in the service of the church, alternately to court the breeze or wave away the flies, till we hear of the fan as brought to France by Catherine De Medicis, when it was no longer stiff and unyielding, but light and pliable. In the early part of the seventeenth century, it was so constructed that it could be folded in the manner of those used in the present day. Formed of paper and perfumed leather, it became the delight of the French court; and, attracting the attention of artists, Fans in the luxurious reigns of Louis XIV. and Louis XV. (in the latter under the name of "*Pompadours*"), shone with gilding and gems, and at length glowed with the pictures of Boucher and Watteau; until at length no toilet was esteemed complete without a fan, the cost of which was frequently in those days as high as from 12*l.* to 15*l.* sterling. In Italy, on the contrary, in the early part of the seventeenth century, even painted Fans were of a very moderate price, and of universal use. "The first Fans," says Coryat, in his *Travels* in 1608, "that I saw in Italy, I did observe in this space between Pizighiton and Cremona; but afterwards I observed them common in most places

where I travelled. These Fans both men and women of the country do carry to cool themselves with in the time of heat by often fanning of their faces. Most of them are very elegant and pretty things. For whereas the frame consisteth of a painted piece of paper and a little wooden handle, the paper which is fastened into the tops is on both sides most curiously adorned with excellent pictures, either of amorous things, having some witty Italian verses or fine emblems written under them; or of some notable Italian city, with a brief description thereof added thereto. These Fans are of a mean price, for a man may buy one of the fairest of them for so much money as countervaileth an English groat."

England must have been a great buyer of fans in the last century, as a lady of that period would have felt as awkward without her fan as a gentleman without his sword. Indeed Addison makes the comparison, and in the *Spectator* he describes an academy where the use of the fan is taught. "In the flutter of a fan," he observes, "there is the angry flutter, the modest flutter, the timorous flutter, the confused flutter, the merry flutter, and the amorous flutter." He says, "I have seen a fan so very angry that it would have been dangerous for the absent lover who provoked it to have come within the wind of it."

Gay, again, gives the Fan as a present from Venus to a despairing lover, in order to soften his mistress, and describes in verse the hint which the peacock's tail presents for its construction.

CHINA.

In Fan-making the Chinese and French are the great rivals, and may be said to monopolize the supply of the whole world. In the lacquered fans the superiority of the natives of China is fully admitted; they are unrivalled, especially when price is taken into consideration, in the sculpturing and piercing of the wood, bone, ivory, or mother-of-pearl framework. Even their commonest fans are remarkable for boldness and originality of design, brilliancy of colouring, sharpness of drawing, and solidity and correctness of workmanship. The manufacture of fans is carried on almost exclusively at Canton, Sou-tchou, Hang-tchou, and Nankin. The fans of ivory and bone and of feathers, are made exclusively for exportation to Europe or America; those used by the Chinese are of bamboo polished or japanned, and covered with paper: they are sold at from 10*d.* to 1*4s.* 6*d.* per dozen, according to the quality of the frame and the design of the leaf.* The examples which are in the Great Exhibition did not, however, come direct from any Chinese maker, but were contributed by Three English Exhibitors, viz.: MESSRS. C. T. BRAINE, J. DANIELL, and HEWETT and CO. The examples exhibited comprise Fans of painted and embroidered Feathers; a Feather-fan painted with silver outlines, representing groups of Chinese figures, the feathers being alternately blue and white; an Ivory-fan elaborately carved and pierced, and, considering the amount of work, very cheap, its price being only 20*s.* There are also several very common Paper-fans, ornamented either with rude delineations of landscapes, or besprinkled with gold-spangle.

* *Étude pratique du Commerce d'Exportation de la Chine*, by Natalis Rondot, pp. 92, 93.

FRANCE.

Fan-making has arrived at a high degree of perfection in France, and presents a remarkable instance of the subdivision of labour, as may be gleaned from the statement, that about twenty different operations, performed by as many pairs of hands, are necessary to the production of a fan which sells for less than one halfpenny; and that these various processes are not all carried on in a single manufactory, but, on the contrary, form four distinct branches of trade, directed by masters employing the various artisans, who, for the most part, work at their own homes, and who are frequently assisted by their wives and children.

A Fan consists of the frame of solid material, called a "*Pied*," which is composed of the inner ribs or "*Brins*," and the two outer ribs or "*Panaches*," and likewise of the flexible leaf or "*Feuille*." The frame is made of wood, bone, ivory, tortoiseshell, or mother-of-pearl. The first operation is performed by sawing the material into the required form for the inner and outer ribs. These ribs then pass into the hands of another workman, who shapes them with a file, and they are then taken up successively by the polisher, the piercer, the sculptor, the gilder, and the workman who fixes on them the spangles and pins of gold, silver, and steel. The frame is now sent to the manufactory which furnishes the necessary drawings for the series of operations, where it is riveted, the rivet being frequently ornamented with a precious stone.

The Leaf or *Feuille* is sometimes single, but more often double; and it is usually made of paper lined with silk or calico, but also of parchment, lamb's skin, satin, and silk gauze. The richer kinds of *feuilles* are painted in water-colours on vellum, by artists known as *feuellistes*; and the highest and most expensive class by artists of celebrity, since Boucher and Watteau, Camille Roqueplan, Gavarni, Clément Boulanger, and Dupré have affixed their signatures to fans which they have decorated. The devices on the more ordinary descriptions of fans are printed from copper plates, and coloured by hand, and the most common sorts are ornamented by the process of chromo-lithography.

The *Feuille* is folded in a mould of strong paper, and is then mounted on the frame and glued to the prolongations or "*Bouts*" of the inner ribs. The *feuille* of the best fans is after this painted on the edge with gold-size, and gilt with leaf-gold; but the *feuille* of the common fans is printed in Dutch-metal, previous to its being cemented on the frame. The decorator now ornaments the frame with gold or coloured ornaments, and the fan lastly passes into the hands of the overlooker, who attaches the tassels, and selects the proper-sized sheath into which she places it.

The Frame or "*Pied*" is made in the parishes of Andeville, the Deluge, the Boisière, Corbeil-Cerf, and Sainte Geneviève. In the district situated between Méru and Beauvais, in the Department of the Oise, 2,000 workpeople, men, women, and children, are employed in the fan-trade. The woods used are the beam-tree, the plum-tree, ebony, sandal, and the lime-tree. The dexterity and sureness of hand of the peasant-workman are said to be quite wonderful. Considering his want of knowledge of the principles of drawing, his facility in engraving, sculpturing, and gilding is certainly remarkable. The piercing is performed by means of minute saws, which the workman makes for himself with

pieces of watch-spring. A remarkable piece of saw-piercing in the shape of a mother-of-pearl fan is exhibited in the French Section, No. 149; it contains no less than 1,600 holes in the square inch: this tour de-force is the production of one of these peasant-artisans, named Désiré Fleury.

The printing, the colouring, and the mounting of the Feuille, and the final embellishment of the Fan, are usually performed at Paris, under the direction of the Fan-maker, called *par excellence* "*Eventailliste*;" though he has really but little to do with the manufacture of the fan, and must be regarded rather as the collector into one focus, and arranger of the produce of others; yet his labours are not the less essential. The mounting of the feuille, its ornamentation with feathers, and final decoration are the operations usually performed by a small number of workpeople in his own establishment: besides which he furnishes the drawings to the peasant in the Oise for the framework to suit the constant changes in fashion; he instructs his *feuilleiste* as to the style of ornament; he groups together the frames and feuilles; and finally he overlooks the whole to see that the workmanship has been well executed. Except the mountings of the feuille and the final adorning of the fan, the other operations are usually performed by workmen at their own homes. The number of fan-makers or *Eventailistes* in Paris, in 1827, was 15, who employed 1,010 workmen (344 men, 500 women, and 166 children); and sold about 40,420*l.* worth of Fans. According to the *Statistique sur l'Industrie à Paris*," drawn up by our colleague, M. Natalis Rondot and M. Say, it appears that in 1847, there were 122 Fan-makers, comprising chamber-masters as Mounters, *Feuilleistes*, Painters, and Colourers. The value of the fans made was 110,000*l.* These masters employed 575 workpeople (262 men, 264 women, 29 youths, and 20 girls). The workmen on the average earned 3*s.*, and the women 1*s.* 8*d.* per day. The men were for the most part copper-plate engravers and printers, lithographic draughtsmen and printers, painters, and colourers; the women were mounters, illuminators, painters, colourers, and overlookers. Thus in twenty years, it appears that the produce in fans had increased in value nearly threefold, whilst the number of workpeople had diminished to one-half. This change is to be attributed to the employment of machinery; especially of the fly-press in stamping out and embossing the ribs, and the extensive employment of chromo-lithography, an art not practised at the former period. By these means the French have been enabled greatly to increase their exports by the production of cheap fans, to compete with those made by the Chinese. P. DUVELLEROY exhibited some small fans, the price of which was as low as 5*d.* per dozen.

The collection of Fans in the French Department is most complete, and contains several specially decorated in honour of the Exhibition, and of Her Majesty and Prince Albert. Beside these and others, painted by first-rate artists, it comprises most of the descriptions manufactured for exportation, and which possess distinctive characters, according to the market for which they are destined. For instance, some display great differences in the length of the ribs and the portion of the circle occupied by the fans when open: other fans, intended for Turkey and Morocco, are composed entirely of feathers, and, in conformity with the Mohamadan doctrines, no living object is painted on them. The principal foreign markets for fans made in France are the South American States. In the decoration of such fans as are intended for Buenos Ayres, blue and green are

carefully omitted, these colours having political significance, and being prohibited from use on pain of death. All the Exhibitors are of the class called "*Eventaillistes*," as none of the manufacturers of the Department of l'Oise send their productions.

BRITISH COLONIES.

The colonial dependencies of Great Britain contribute many examples of Fans, some of which are interesting on account of their simplicity, whilst, on the other hand, those from India present most striking proofs of the luxurious splendour of the Indian princes. *British Guiana*. Mr. W. H. HOLMES exhibits fans made of the Ita-palm. *Canada*. A fan of somewhat similar nature, but made of the bark of a tree, is contributed by Miss HELEN ROCHELEAU. *Ceylon*. There are several rich "Punkahs" or fans, and a richly painted ivory fan-handle from this island. *India*. The Indian Department contains Fans or *Punkahs* in great variety as regards form, decoration, and the material employed, some of them being of a very costly description. There are, for example, two fans contributed by H. H. the RAJAH of KOTA, one with an ivory handle, the other with a gold handle: but as the names of the various manufacturers were unfortunately not ascertainable at the time the Jury examined these specimens, no prizes were awarded in their favour. The Indian Fan differs from that of Europe and China in not closing, and likewise in its form; and it is usually kept in motion by an attendant. Beside the fans affixed to central handles, all of which are most gorgeously enriched with embroidery and jewels, there are exhibited others resembling a curtain suspended from a silver rod, which is held horizontally by the attendant, and waved backwards and forwards over the head of the wealthy Hindoo: and there is also the circular Standard-fan; the handle being a silver staff, crooked at the top, to which the fan is attached, on the side opposite to the crook. The attendant stands by the side of his master, and placing the end of the staff against his foot, inclines it away from his body and slowly swings it to and fro. There is also a beautiful Peacock-feather Fan from Assam, and a Fan or *Punkah*, composed of China beads and pearls, and made in the city of Delhi. The most simple, however, are those made of the entire or the divided leaf of the *Borassus flabelliformis*, manufactured at Calcutta and commonly used both by natives and Europeans. The other examples comprise, a Punkah made of Khus-Khus grass (*Andropogon muricatus*) which, when wetted, emits a fragrant perfume; Fans made of sandal-wood, from Calcutta; a Fan made of bamboo from Moorshedabad, and several of similar description from other parts of India; and lastly, from Bengal, large and hand-fans, made of the Palmyra-leaf. As far as the Reporters could ascertain the names of the contributors, it appears that, besides the fans from the Rajah of Kota, before named, several of the examples were sent by the RAJAH OF PATTIALA, the RAJAH OF JODHPORE, the JUBBULPORE SCHOOL OF INDUSTRY, and CAPTAIN DALTON. The inspection of these beautiful productions of Indian workmen, naturally suggests the idea that their skill and remarkable taste might be turned to profitable account, if directed to the production of fans suitable to the European and American markets. *Nova Scotia* sends an example of a very simple Indian fan. *Trinidad*. LORD HARRIS, the Governor, sends examples of fans for ladies. And

from *Western Africa*, Mr. R. JAMESON, of Liverpool, exhibits several fans from the banks of the Niger, one of which is made of a species of grass.

EGYPT.

A few specimens of Fans are exhibited in the collection from Egypt, to which much interest attaches, as coming from a country in which, possibly, the Fan was first devised.

SPAIN

There are Two Exhibitors of Fans in the Spanish Court, one of whom contributes Painted and also Printed "*Feuilles*;" and the other both *Feuilles* and complete Fans, some of which are copies from French models. The examples, although they will bear no comparison in point of taste or execution with the splendid Fans from France, are good of their kind; and it would appear that the attention of their Exhibitors has been directed rather to the manufacture of an article for general sale, than to the production of works of art. But it is remarkable, that no finer specimens should have been sent from a country in which the use of fans is so prevalent that they are commonly offered for sale outside the arena of the Bull-fights and other places of amusement.

TENNIS

The Fans in the Tunisian Court are Ten in number, and are in some cases ornamented with rich embroidery.

TURKEY.

The only example is an embroidered Fan made at Adrianople.

WURTEMBERG.

Several Bone-and-Ivory fans are exhibited by M. C. STOLL of Ulm; they are reasonable in price, but not nearly so good as the Ivory-fans contributed by the French makers.

The number of Exhibitors of Fans is Twenty-three : of these, there are :—

- 2 Holders of a Prize Medal.
1 Who obtained Honourable Mention.
20 Unrewarded.
—
23 Total.

The number from the various countries is as follows:—

British Colonies:—				China	-	-	-	-	-	3
British Guiana	-	-	1	Egypt	-	-	-	-	-	1
Canada	-	-	1	France	-	-	-	-	-	3
Ceylon	-	-	1	Spain	-	-	-	-	-	2
India	-	-	5	Tunis	-	-	-	-	-	1½
Nova Scotia	-	-	1	Turkey	-	-	-	-	-	1
Trinidad	-	-	1	Wurtzburg	-	-	-	-	-	1
Western Africa	-	-	1							
				Total	-	-	-	-	-	23
										9 K

19 K

LIST OF AWARDS.

DUCROT and PETIT, Paris (France No. 149). Honourable Mention, for a collection of Fans in ordinary demand and at reasonable prices, namely, from 5*l.* to 40*s.* each; also excellent examples of pierced and sculptured ivory and mother-of-pearl fans, one of the specimens of which has been before alluded to in the introductory notice. These are of much higher quality, and range in price from 3*l.* to 12*l.* each.

DUVELLEBOY, P., Paris (France No. 495). Prize Medal, for a display of Fans ornamented with artistic paintings, and remarkable for the beauty of the inlaying, and the pierced ivory and mother-of-pearl frames. The most elegant fan in this collection is one painted by Roqueplan; the ribs are of richly-pierced and sculptured mother-of-pearl inlaid with gold; it is valued at 40*l.* Beside the above, others intended for foreign markets were exhibited, the prices of which vary from 5*l.* to 40*s.* per dozen.

FÉLIX, ALEXANDRE, Paris (France No. 199). Prize Medal, for a collection of Fans, being for the most part copies of the best examples of ancient fans: these, although not possessing the merit of originality, are such remarkably beautiful specimens of vollum-painting, that they fully entitle this manufacturer to the Award, and are moreover the richest of any exhibited.

V.—PIPES AND AMBER-MANUFACTURES.

Before discussing the merits of the Pipes contributed from all quarters of the globe to adorn the Great Exhibition, it will be proper to notice the materials principally employed in their manufacture.

Clays, of different kinds, are more used than any other substance in the formation of pipes: but as their nature and composition will probably be fully discussed in the Special Report on the Fictile Arts of which Clay pipe-making is comparatively but a small branch, it is needless here to describe them.

Woods of several descriptions are next in importance. The wild cherry-tree, and the jasmine are the principal sorts, and great care is bestowed on their culture to insure their growing free from knots and blemishes; the young stems of the jasmine being wound round with cloths to effect that object. Lemon-tree and ebony are also in request, the latter being generally used for carved tubes.

Mother-of-pearl, *Horn*, *Ivory*, and *Bone* are extensively used; nor are the *precious metals* and costly *gems* excluded from a share in the formation of the pipe. But these have not that intimate connection with the subject under notice, which appertains to two materials—*Meerschaum* and *Amber*, whose names are euphonious to the ear of the genuine smoker. The former substance is devoted exclusively to his use; and the latter, though not entirely his own, pays to him a very considerable tribute in the form of mouth-pieces.

So early as the year 1609, the genuine Meerschaum must have been held in estimation in England; since Dekker appears to refer to it in his "*Gull's Horn-book*," when he wishes his gallant to be able to discourse "which pipe has the best bore, and which burns black, and which breaks in the burning."

MEERSCHAUM (*Écume de mer*) is a mineral of somewhat rare occurrence. It consists of magnesia, silica, and water, and may be called a hydrated silicate of magnesia ($MgO, SiO_2 + HO$). As the compound is not crystalline, its constituents

are variable, and thus silicates of iron and alumina are often found in combination with it. These affect the colour of the Meerschaum, which when pure is quite white. Silicate of iron frequently occurs, and gives it a tinge of colour, varying from the palest yellow to a deep brown. Good Meerschaum is tolerably soft, it resists the pressure of the hand, but is easily indented by the finger-nail, and, especially after having been wetted, may be easily cut with a knife. The fracture is generally earthy, and rarely conchoidal; still the state of aggregation of even pure meerschaum is very variable, as is proved by the marked differences in its specific gravity. Some kinds sink in water, others float on its surface: these qualities in the estimation of the pipe-maker are indicative of different values, for he rejects both the very heavy and the very light, and prefers those of medium density. The light varieties are generally very porous, and even contain large cavities, whilst the heavier kinds, he suspects to be an artificial product.

Meerschaum is met with in various localities in Spain, Greece, and Moravia; but by far the largest quantity is derived from Asia Minor, it being dug chiefly in the peninsula of Natolia, near the town of Coniah. Formerly the material was roughly fashioned on the spot into bowls, which were more elegantly carved in Europe. The art was especially cultivated in Pesth and Vienna, where it formed an extensive and important branch of trade. These rough bowls still occur in commerce, but by far the greater part of the meerschaum is exported in the shape of irregular blocks with obtuse angles and edges, requiring careful manipulation with the aid of water, in order to remove irregularities and faulty portions. (A beautiful specimen of meerschaum thus cleaned is contributed by LUDWIG HARTMANN, Austria, No. 675; there is also a box of meerschaum earth in the Grecian Department, No. 23.) This preliminary treatment still leaves numerous blemishes, and the meerschaum of commerce has defects of various kinds; besides various minerals scattered through its mass, it contains a hard sort of meerschaum, which the manufacturer calls chalk (*Kreidenmassen*), and which is the cause of much difficulty in the carving.

Previous to the mechanical treatment of the meerschaum* for making the bowl, it is subjected to a certain preparation. It is soaked in a liquified unguent composed of wax oil, and fats. The wax and fats which the substance absorbs cause the colours which meerschaum assumes after smoking. Under the influence of the heat produced by the burning tobacco, the wax and fats pass through all the stages of a true process of dry distillation; the substances thus formed become associated with the products of the distillation of the tobacco, and by their diffusion through the meerschaum, all those gradations of colour which are so highly prized by the connoisseur are produced.

Occasionally, though rarely, the bowls are artificially stained by dipping them, before they are soaked in wax, in a solution of copperas (sulphate of iron), either alone or mixed with one of dragon's blood. This process must manifestly affect, very materially, the shades of colour produced in smoking.

Attempts have not been wanting to imitate meerschaum, the process being rather mechanical than chemical; for although chemists have of late been very

* This subject is ably discussed under the head "Meerschaum," in Precht's "*Encyclopædic der Gewerbe und Künste*," from which some of the foregoing remarks have been abstracted.

successful in the artificial production of minerals, for instance, palagonite (Bunsen), spinelle (Ebelmen), crystallized carbonates (Senarmont), no one has attempted the production of meerschaum, chemically.

The large quantity of meerschaum parings that are left in roughing-out the bowls would entail considerable loss, unless some process had been devised of rendering them available. A species of meerschaum-bowls has long been known in commerce under the name of *Massa-köpfe* (massa bowls), which is made from the parings; these are triturated to a fine powder, boiled in water, and moulded into blocks with or without the addition of clay: each of these blocks suffices for one bowl; but before they can be used they must be allowed to dry for some time, as they contract considerably. Specimens of composition pipe-bowls and cigar-tubes are exhibited in the Austrian Section, No. 687. These bowls are distinguished from real meerschaum by their greater specific gravity; but there is no very certain test by which the real meerschaum can be distinguished from the composition, and many suppose that all the heavier descriptions are spurious, though there is no absolute proof of this being the case. A negative test may however be mentioned; the composition bowls never exhibit those little blemishes which result from the presence of foreign bodies in the natural meerschaum, therefore if a blemish occur in a meerschaum bowl, which is very frequently the case, the genuineness of the bowl is rendered most probable; but as these do not show until after the bowl has been used for some time, the test is not of much value.

Amber.—The most extensive use of this elegant material is for the manufacture of the mouth-piece, an essential constituent of the genuine meerschaum and Turkish pipe. Up to the present day, amber mouth-pieces continue in great request in the East, where they fetch very high prices, instances of which will be quoted. There is a current belief in Turkey that amber is incapable of transmitting infection; and as it is a great mark of politeness to offer the pipe to a stranger, this supposed negative property of the amber accounts in some measure for the estimation in which it is held. In the Christian countries of Europe, ivory, bone, and horn, have to some extent usurped the place of the more costly material, which is reserved for the higher class of pipes. Amber is also much employed in numerous small fancy articles, especially for heads, necklaces, brooches, and earrings. The Exhibition furnishes also examples of its being worked occasionally into candlesticks, salvers, pipe-tubes, and other larger articles. The coarser descriptions and chips of amber are also employed for the manufacture of varnish, and the preparation of amber-oil and succinic acid, which it yields by distillation at a moderate temperature. Copal, which bears a strong resemblance to, but is much cheaper than amber, is occasionally substituted for it, fraudulently or through ignorance. There is no difficulty in distinguishing the two by a chemical analysis, but this renders the sacrifice of a small piece of the substance necessary; some varieties of amber, especially the dark yellow and transparent descriptions, are scarcely to be distinguished, unless by a well-practised eye, from copal. A few words may be said respecting the chemical characters of amber which, however, do not affect its employment in manufactures. According to an analysis of Berzelius, it contains a volatile oil, succinic acid, two resins soluble in alcohol and ether, and a complex bituminous substance (succinic bitumen) which is not affected by any solvent.

The mode of obtaining amber is peculiarly interesting. The greater part is

found on the coast of Prussia Proper, especially between Königsberg and Dantzic; it is distinguished as terrestrial and marine amber; the former is dug in mines, and is generally found in alluvial deposits of sand and clay, associated with fossil wood, iron pyrites, and alum-shale. Amber is also found in some other countries, but never to any amount. The marine amber is cast ashore during the autumnal storms on the coast of Pomerania and Prussia Proper. It is then picked up, or fished for with small nets. There are several fine specimens of both descriptions of amber in the Austrian Section, No. 675, and in the Prussian Section, Nos. 438, 439, 440, and 441. In the case bearing the latter number are specimens of land amber, and the fossil wood associated with it which were obtained at a depth of 60 feet by the Exhibitor, M. TESSLER, who employs about 20 workpeople in his amber-pits. The opinions respecting the origin of amber are very divided, some hold the view expressed by Tacitus in his *Germania*, that it is a resin exuded by certain coniferæ, traces of which are frequently observed among the amber. Others assume it to be a species of wax or fat, having undergone a slow process of putrefaction; and they base their views upon the fact that chemists are able to convert cerous or fatty substances into succinic acid by inducing oxidation artificially. It is quite certain that at one time amber must have been liquid, for numerous small animals are found enclosed within it; these for the most part are insects belonging to an extinct species of *Arachnida*. There are numerous and excellent specimens of amber enclosing insects in the Prussian Section, No. 441, and others in a case which deserves favourable mention from D. T. TESSLER, who has sent one specimen containing the leg of a toad.* The processes which nature employs for the preservation of the structure of extinct insects, is one which the microscopist successfully imitates by embalming his delicate dissections in Canada balsam between two slips of glass.

There is evidence of the extreme antiquity of amber in the fact that the Phœnicians of old fetched it from Prussia. Since that period it has been obtained there uninterruptedly, and no diminution in the quantity annually collected has been perceived. This would almost induce a belief in the correctness of the putrefaction theory, above alluded to, and we may perhaps assume that a constantly new formation of amber is taking place. This view is somewhat strengthened by the different appearance of the varieties of amber, which seem to exhibit the successive stages of its development and decay: still this conclusion to many will appear strained. The different kinds of amber are distinguished by varieties of colour and degrees of transparency. It is found of all shades of yellow, from the palest primrose to the deepest orange, or even brown. In point of clearness amber varies from vitreous transparency to perfect opacity, specimens being obtained nearly as white as ivory; in this latter case the transformation is assumed to have advanced farther than in the ordinary varieties. It is rarely found, and is chiefly used for cameo-ornaments, and is mounted on darker amber which forms the background. Several examples of its employment are exhibited in the Prussian Section.

An inquiry naturally suggests itself as to which of these varieties of amber is the most valuable. It is self-evident that this must depend, as in the diamond,

* According to M. Natalis Rondot, specimens of amber containing insects are of frequent occurrence in China.

upon the size and the uniformity of the pieces. Besides, as all the varieties, excepting the white which has its special uses, are equally applicable for manufacturing purposes, it follows that the value of any particular sort must depend in a great measure upon its rarity. The straw-yellow, slightly cloudy, translucent variety is the most rare, and is that which the Orientals prefer to all others, and which they purchase at extravagant prices. There are few specimens of it in the Exhibition, and it is needless to search for them in the German Department, as every piece that is found in Prussia is exported to Turkey in the raw or manufactured state; and it is in the Section occupied by this latter country (Nos. 1928, 1929) that the only specimens in the Exhibition will be found.

Some writers are of opinion that the preference which the Orientals show for the pale-yellow, slightly clouded variety, has been transmitted to them from the ancients, but their arguments will not bear a close examination.

Having alluded to this matter, it will be as well to advert to the opinions held on the subject by the ancient authors. It appears that the word "electron" (amber) had two significations; one referred to the substance which we call amber, hence the derivation of the word electricity, from its long-known property of attracting, when rubbed, light substances, such as straws, which was the first electric phenomenon ever observed; the other meaning applied to an alloy of gold and silver found in nature, or produced artificially. Pliny* expresses himself very clearly on this point; he says that gold always contains silver, and that when the silver amounts to one-fifth of the compound it is termed "*electrum*;" if the proportion is higher, the *electrum* ceases to be malleable.

It has been assumed that the latter was the original meaning of the term, and that it was subsequently applied to amber on account of its resemblance to the white gold, the variety most closely resembling the alloy possessing the highest value. This view is supported by the circumstance that we find "electron" spoken of by the epic poets Hesiod and Homer as employed in articles for which amber would scarcely be applicable. The application, for instance, of amber for shields might cause some alarm for the safety of the Homeric heroes. But the ancient poets did not always pay minute attention to the natural qualities of the materials which they mentioned in their narrative: this is evident from Hesiod employing other fragile substances, such as ivory and alabaster in the manufacture of shields. Moreover, the fine carving of these show-pieces was not adapted to resist heavy blows. The learned Buttmann (*Abhandlungen der Berliner Academie*, 1818, 1819) very correctly observes that these works of art are derived by the poet direct from the workshop of Vulcan, and that this at once does away with any protest against the insecurity of ivory, alabaster, or enamel in the manufacture of his shields. The same learned antiquary has compared critically the most important passages in which the word "electron" occurs, and he has demonstrated, incontrovertibly, that the word originally meant amber, and that the second interpretation has only been introduced at a later period, especially by the tragic poets. Thus it

* *Historia Naturalis*, xxxiii., c. 4. *Omni auro inest argentum vario pondere, alibi densa, alibi nona, alibi octava parte. Uticunque quinta argenti portio est, electrum vocatur. Fit et cura electrum argento addito; quod si quintam partionem excessit, incutibus non resistit. Et electro auctoritas Homero teste, qui Menelai regiam auro, electro, argento, eburi fulgere tradit.*

Id. Page 469, vol. ii., of Holland's Translation.

follows that the transmission of the predilection for the straw-coloured cloudy amber from the ancients is far from being proved, and that we must content ourselves with the explanation first attempted, of its resulting from the greater rarity of this kind of amber. This predilection appears to be confined to the East, as in other countries, *e. g.*, Russia, the orange-yellow transparent variety is decidedly preferred, possibly on account of its cheapness. The Russian peasant girls adorn themselves with double and treble rows of amber beads; though frequently they are supplied with mere copal-heads instead of the genuine article.

Having made these general observations on the character of amber, we pass to the detailed consideration of what has been presented to us in the Exhibition under the head of Pipes and Amber-Manufactures.

GERMANY.

No one will be surprised that this land of smokers bears off the palm in the manufacture of pipes and amber; nor that her Exhibitors outnumber those of all other nations collectively. All the States of Germany, however, have not contributed equally, the pipes being chiefly from Austria, and especially from Vienna, and the amber-manufactures from Prussia. The meerschaum works of the Viennese are unrivalled, as regards taste in design and excellence in execution; the carving of many of the pipe-bowls and cigar-tubes being examples of highly cultivated art. Most of the fancy pipe-tubes, composed of horn and mother-of-pearl, are more curious than graceful; the cherry-tree-tubes are in great variety, and are good examples of this component of the long pipe; besides these, there are large numbers of bone- and wood-mouth-pieces and others made of amber, the latter being beautifully worked.

The Meerschaum pipes from Prussia are not numerous, nor are they so elaborate as those of Austria. The Prussian Section presents such a series of amber specimens as are not likely to be again collected; the manufactured amber does not, however, evince much feeling for artistic design on the part of their Exhibitors, whose merits rest principally on the excellence and difficulties of the workmanship.

The contributions from the other parts of Germany consist of meerschaum and other pipes from Bavaria, which are not remarkable; porcelain pipes from Hamburg, and clay-pipes from Nassau. Those from Hamburg are of fancy forms, and those from Nassau are chiefly plain descriptions, which are sold at exceedingly low prices.

BRITISH COLONIES.

British Guiana.—T. B. DUGGIN sends a specimen of a pipe, or rather tube, used by the aborigines for smoking tobacco, called a Winna; it resembles a cheroot in outward appearance, but is hollow so as to contain the tobacco. It is said to be made from the rind of the fruit of the Manicote-palm (*Areca manicot*, Lodd.), from the River Berbice. It may be remarked that such tubes, made of paper covered with a leaf of tobacco, are now manufactured in England. *Canada* contributes a collection of well-made Clay-pipes. The *Indian* collection contains examples of the costly and beautifully ornamented cocoa-nut and lac-Hookahs, mounted in silver with their rich tubes or Snakes, and the simple pipe composed

of two pieces of bamboo, one for the bowl cut close to a knot and a smaller one for the tube. These primitive pipes are in common use amongst the poorer natives of India, and yet Dr. Royle cites an extemporary pipe sometimes used by the natives, which surpasses even this in simplicity; the amateur makes two holes, one longer than the other, with a piece of stick, in a clay soil, inclining the stick so that they may meet; into the shorter hole he places the tobacco, and applies his mouth to the other, and thus luxuriates in the fumes of the narcotic herb. There is, likewise, a specimen of the Singoo Opium pipe which is of very small dimensions, the tube not being larger than a thimble. The opium is placed in the bowl, and ignited by placing a piece of charcoal on it, which is effected with a small pair of tweezers, which find a place in this interesting and well-arranged collection.

CHINA.

The habit of smoking is very general in China, being common to both sexes in all classes of society, and at all ages. In every part of this vast empire the tobacco plant is cultivated, and consumed both as snuff and for smoking. So prevalent is the habit that little girls and boys are commonly seen smoking, and from this early period it is persevered in by its votaries through life. It is always customary to offer visitors a cup of tea and a pipe. M. Natalis Rondot estimates the number of smokers in China as at least 100 millions, and states that pipes are made in enormous numbers and in an almost infinite variety of forms; they are of three classes, the water-pipe, the straight-pipe, and the opium-pipe. The Chinese pipes are generally very long, and the bowl very small, it being usually made of nickel copper (white metal). The only contribution, however, is from Dr. Berncastle, who sends an opium-pipe and appurtenances.

EGYPT.

The Specimens in the Egyptian Court comprise two Narguilés or water pipes, one of zinc and one much richer, mounted in silver; also several Pipe-bowls of Assouam and Assiout.

FRANCE.

The examples consist of clay-pipes only, from Two Exhibitors; they are very numerous, and are exceedingly well manufactured, but their forms are not such as to sustain that high reputation for graceful design which this country enjoys. This is to be attributed to the class of persons for whom the pipes are intended, and who prefer a pipe-bowl moulded into the form of some grotesque head with staring eyes, to the most elegant figures which could be devised. Very large quantities of these pipes are exported to England, Germany, Italy, the United States, and other countries, and are much esteemed on account of the very excellent quality of the earthenware of which they are formed. Their superior texture, it appears, is due in some measure to the clay of which they are chiefly composed, but principally to the great skill of the manufacturers in compounding it with other materials. To give some idea of the extent of the pipe-manufacture at St. Omer, it may be stated that one of the exhibiting manufactories—that of DUMERIL, SONS, and Co.—employs 450 workpeople, and produces annually 100,000 gross, or nearly Fifteen

million pipes, varying in price from 1*d.* per dozen to 3*d.* each; and that the other—that of L. FIOLET—employs 850 workpeople, and produces 200,000 gross, or nearly Thirty million pipes, consuming 7,874 tons of clay in their manufacture.

PERSIA.

Mr. J. B. THOMSON contributes a Narghili or Narguilé, and a lady's amber-mouth-piece; and Mr. J. HUDSON several specimens of pipes, which illustrate the luxurious habits of the Persians in smoking.

SARDINIA.

The contributions from this country consist of beautiful examples of carved meerschaum-pipe-bowls, which equal those of Austria, but are insignificant in point of number, having been contributed by only One Exhibitor.

TURKEY.

In the Turkish collection are numerous rich examples of the Narguilé, or water-pipe, in some cases composed of silver, and ornamented with precious stones; the flexible tube, or *Marpitch*, used with the Narguilé, is formed of a spiral wire covered with leather, over which another wire is coiled, so as to fall between the interstices of the inner spiral. The Turks, in smoking the Narguilé, inhale the fumes into the lungs, and never consume the last portions of the tobacco, as the smoke becomes too pungent. There are numerous examples of the Long-pipe, or *Kablioun*, and the Short-pipe, or *Chibouque*, with the Cherry-tree, Jasmine, Wild plum, and Ebony-Tubes; and likewise the crude gimblets, with which these tubes, five feet or more in length, are bored. In boring the tube, the Turk places it above the gimblet and thus gets quit of the chips; after boring the hole half way, he meets it from the other end of the stick. The wild cherry-tree, which is principally used, seldom occurs free from defects in the bark, to repair which, so that the reparation cannot be discovered, is the chief difficulty. There are examples of Lulés or Pipe-bowls used with these tubes; they are composed of the red-clay of Nish, mixed with the white-earth of Roustchouck. They are very graceful in form, and are, in some cases, ornamented with gilding, but as the Turk prefers a fresh bowl each time, the plain ones are chiefly employed on the score of economy. It is not unusual in Turkey to compute distances, or rather the duration of a journey, by the number of pipes which might be smoked in the time necessary to accomplish it. The *Imames* or amber Mouth-pieces exhibited in the Turkish Section surpass those of any other in splendour. One Exhibitor sends four of choice amber, which are worth, together, 1,000*l.*; besides these, there are three groups from distinct Exhibitors; in the case of one was noticed an amber Cigar-tube, which is one of numerous instances of the innovations upon Turkish customs by the introduction of European ideas. If more Awards have not been made for Turkey than those cited in the list, it does not arise from want of meritorious examples, but simply because it was quite impossible to obtain a correct catalogue of Exhibitors at the time the Jury examined the articles contributed from this country.

TUNIS.

Weeds for pipes, and two embroidered Pipe-guards, are the only contributions.

TUSCANY.

The only example in the Tuscan Section is a beautifully carved ebony Pipe-tube.

UNITED KINGDOM.

The pipes in the British side of the Exhibition are unimportant ; two consist of steel, one is a contrivance for condensing the fumes of the tobacco, and the other two are of meerschaum. No common clay-pipes are exhibited ; their manufacture forms a distinct branch of the Fictile-art, and is usually practised by small makers ; the processes employed being very simple and performed with wonderful celerity. The stem of the pipe is first formed by rolling a piece of clay with the hand on a slab until it forms a cylinder slightly tapered ; a ball of clay is then attached to the thickest end, and placed in a mould formed of two halves hinged together, by merely closing the mould the clay assumes the form of the outside of the bowl ; a plunger corresponding to the intended cavity is then forced in, and the excess of clay which exudes pared off. The pipe is completed by threading the stem on to a wire, which thus forms the bore, and, after drying, it is baked in a furnace of peculiar construction.

The number of Exhibitors of Pipes and amber is Forty-nine, of these there are :—

10	Holders of a Prize Medal.
18	Who obtained Honourable Mention.
21	Unrewarded.
49	

The number of Exhibitors from the various countries is as follows :—

Austria	- - - - -	13	} Germany 28.
Bavaria	- - - - -	1	
Hamburg	- - - - -	1	
Nassau	- - - - -	2	
Prussia.	- - - - -	11	
British colonies :—British Guiana, 1 ; Canada, 1 ; and			
India, 1	- - - - -	3	
China	- - - - -	1	
Egypt	- - - - -	1	
France	- - - - -	2	
Persia	- - - - -	2	
Sardinia	- - - - -	1	
Turkey	- - - - -	5	
Tuscany	- - - - -	1	
United Kingdom	- - - - -	5	
		49	

LIST OF AWARDS.

ALBA, SAMUEL, Vienna (Austria, No. 664). Honourable Mention is accorded to this Exhibitor, for a very large collection of meerschaum Pipe-bowls, Cigar-tubes, and amber Mouth-pieces. The plain bowls and cigar-tubes, and those ornamented with foliage are very creditable productions, but where human figures are introduced, they are not so well executed.

ASTRATH, CARL, Vienna (Austria, No. 666). Prize Medal, for an assortment of most exquisite specimens of meerschaum Pipe-bowls and Cigar-tubes; the sculpturing of the figures displaying remarkable artistic skill, and the execution of leafage being bold and sharp. Considering the excellence of the work, the prices are very moderate (No. 10243, 30s.; No. 10208, 45s.; Cigar-tube with figure of Venus, 45s.; another with that of Hercules, 53s.) Besides the above, the collection comprises several of the richest amber Mouth-pieces, one of which is valued at 33*l*.; some of the Mouth-pieces are flat, such as are used in Germany; others round, such as are used in the East.

BEISIEGEL, PHILIP, Vienna (Austria, No. 667). Honourable Mention, for meerschaum Pipes with silver mounts and amber Mouth-pieces; meerschaum Pipe-bowls and Cigar-tubes; cherry-tree and ebony-Pipe-tubes, and plain amber Mouth-pieces, which are all very well manufactured, and of good design.

DUMERIL, SONS, and Co., St. Omer, Pas-de-Calais (France, No. 176). Honourable Mention, for a great variety of Clay-Pipes, such as are used by the working classes, and more particularly by the peasantry. These pipes are more remarkable for their cheapness and very excellent manufacture than for any beauty of design.

FIOLET, LOUIS, St. Omer, Pas-de-Calais (France, No. 211). Honourable Mention, for a large assortment of Clay-Pipes exceedingly well-made. The bowls are mostly in the form of heads, some intentionally grotesque, and others intended to represent eminent personages, scarcely less so, on account of the eyes being picked with two dabs of black. These pipes are not remarkable for any of that excellent taste usually displayed by the French.

FLÖGE, GERHARD, Vienna (Austria, No. 670). Prize Medal. Carved meerschaum Pipe-bowls and Cigar-tubes in great variety, and of excellent designs and execution; also a large collection of Amber for smoking purposes, including the round Mouth-piece used in Turkey.

FRIEDRICH, JOHANN, Vienna (Austria, No. 671). Prize Medal. A very large assortment of meerschaum Pipe-bowls and Cigar-tubes, with amber Mouth-pieces of beautiful designs, frequently containing several figures, which are exquisitely and boldly sculptured. The prices, which vary from 17*s.* 6*d.* to 7*l.* 10*s.* each, are reasonable.

GRÜNHUT, J., Jun., Prague (Austria, No. 673). Honourable Mention is accorded for a meerschaum Pipe-bowl and two Cigar-tubes, the carving of which is very sharp and spirited.

HADJI, MIHRAN DUZOGLOU (Turkey, Nos. 1928, 1929). Prize Medal, for Four most splendid Imames or round amber Mouth-pieces, richly ornamented with brilliants; the two shortest, which in smoking are pressed against the lips, are each worth 305*l.*, and are of that peculiar colour and degree of transparency which

approaches nearest to the Turkish ideal of beauty; the two longer Mouth-pieces are of a different form, and although not of so good a colour, nor enriched with as many diamonds, are yet worth 200*l.* each.

HARTMANN, LUDWIG, Vienna (Austria, No. 675). Prize Medal, for a very large collection of well-made Mouth-pieces of amber, mother-of-pearl, bone, and wood; cherry-tree, and other Pipe-tubes; hard-wood Cigar-tubes from 1*d.* to 2½*d.* each; Walking-sticks from 9*d.* to 7*s.* 6*d.* each; meerschaum Pipe-bowls and Cigar-tubes; the foregoing articles are those in general use in Germany, and consequently they are not elaborately ornamented.

HENDERSON, —, Montreal (Canada, No. 187). Honourable Mention is accorded for a case of well-made Clay-Pipes.

HOFFMANN, C. W., Dantzic (Prussia, No. 439). Prize Medal. A large assortment of Amber-manufactures, amongst them a pair of Candlesticks of smoky amber, 22*l.* 10*s.*; a Letter-weight of a single piece, 9*l.*; a Snuff-box set in gold; and other articles which are well manufactured, but are not remarkable for beauty of design.

HOFFMANN, G. J., Dantzic (Prussia, No. 440). Honourable Mention (*the same Award by the Jury of Class XXIII.*), for a very large collection of Amber-Beads, some of which are of large size.

JANTZEN, G. E., Stolpe (Prussia, No. 205). Honourable Mention (*the same Award by the Jury of Class XXIII.*), for an assortment of Amber-manufactures, comprising Necklaces made of strings of very beautiful pearl-like beads, which are very rare; a Ladies'-companion, the handles of the various instruments it contains, and also the needle-case and crochet-needle-holder being of amber; besides these the Collection comprises several miniature ornaments of amber.

LUX BROTHERS, Rhula, Saxe Gotha (Prussia, No. 796). Honourable Mention, for a great variety of plain meerschaum Pipe-bowls, imitation meerschaum Bowls, painted porcelain Bowls, and carved Wood Pipes.

MANNHEIMER, WOLFF, Königsberg (Prussia, No. 438). Honourable Mention (*the same Award by the Jury of Class I.*), for the exhibition of two unusually large pieces of Amber; one of which is a specimen of that sort obtained in the amber pits, and has a rough exterior; it weighs 6 lbs.: the other is marine amber, and is water-worn; it weighs 4½ lbs.

MÜLLENBACH and THEWALD, Hoebr (Nassau, No. 10). Honourable Mention, for remarkably cheap Clay-pipes, varying in price from 6*d.* to 2*s.* per hundred.

NAIM EFFENDI, Constantinople (Turkey, 1441, 1447). Prize Medal, for a valuable collection of round amber Mouth-pieces, for the chibouque or long pipe, ornamented with rings of artificial aventurine and with jewels; the prices of these vary, according to the size and colour of the Mouth-piece, the lowest being 37*s.* 6*d.*, and the highest 35*l.*; and also for a collection of jasmine Pipe-tubes.

PARTSCH, A. JUN., Theresienfeld (Austria, No. 611). Honourable Mention, for an assortment of cheap clay Pipe-bowls, coloured and glazed.

ROMOLI, LUIGI, York-terrace, Chelsea (Tuscany, Nos. 118, 119). Honourable Mention, for an ebony Pipe-tube, wrought in pierced carved work.

ROY, W. VOX, Dantzic (Prussia, No. 441). Honourable Mention, for a most interesting collection of all the known varieties of amber, systematically arranged in our cases, which contain likewise succinic acid, crude and pure, obtained from

amber. Also for various manufactured articles, amongst which the most remarkable is an oblong Salver, composed of separate pieces of amber arranged to form a mosaic pattern, the Royal Arms of England being engraved in the centre.

SAID AGA (Turkey, 3369, 3372). Honourable Mention, for an assortment of those amber Mouth-pieces which are in most general use in Turkey, and which vary in price from 10s. to 30s.; and also amber Cigar-tubes; and a large collection of Pipe-tubes, and wood Mouth-pieces.

STRAUSS, J., Turin (Sardinia, No. 80). Prize Medal, for several elaborately carved meerschaum Pipe-bowls, the sculpturing of which is very exquisite.

TESSLER, C. L., Stolpe (Prussia, No. 41). Honourable Mention is accorded for various manufactures in amber, among which are strings of well-formed spherical Beads, a Cigar-tube, a Ring-stand composed of different coloured ambers, the ornament and workmanship of which are very good. This Exhibitor has likewise sent a specimen of land amber, together with the fossil wood with which it is generally associated.

WINGENDER BROTHERS, Hoeft (Nassau, No. 9). Honourable Mention is accorded for an assortment of various descriptions of Clay-pipes, intended chiefly for exportation, and which are remarkable for their low price, 5s. 6d. per thousand.

WINTERFELD, J. A., Breslau (Prussia, No. 204). Prize Medal, for the largest collection of Amber-manufactures, the workmanship of which is exceedingly good: also a collection of most of the varieties of raw Amber. The manufactures comprise amber Mouth-pieces; large Pipe-tubes, composed entirely of amber; amber Cigar-tubes; Ear-rings; Necklaces; Cameo-brooches, the white opaque amber forming the figure or head; a set of Chess-men; and numerous other articles.

WÖBECKE, H. (Hamburg, No. 89). Honourable Mention, for a collection of well-made Pipes manufactured with Turkish clay.

ZEITLER, JOSEPH, Vienna (Austria, No. 687). Prize Medal. Massa Pipe-bowls and Cigar-tubes, which are manufactured from meerschaum dust. The forms of these articles are elegant, and the execution so good that they are distinguished only with difficulty from the real meerschaum. The price of massa pipe-bowls is much lower than those of the real meerschaum, and they are usually mounted with plated instead of real silver tops.

VI.—SNUFF-BOXES.

The boxes, which are known under this very general name, have exhibited equally the extremes of coarseness and of elegance. Under the former condition they will be remembered in the box of horn, brass, or japanned iron—the last, however, being known rather as a common receptacle for tobacco; and in the latter state they will be recognised in the countless portable depositories for snuff, for which all the most costly productions of nature have supplied the materials.

The word snuff is an inflection of the old northern verb *sniff*; and it existed as a term expressive of strong inhalation through the nostrils, or of angry impatience, long before the invention of the substance to which it now gives a name. Out of the latter signification originated the colloquial expression of the sixteenth and seventeenth centuries to “snuff pepper,” or to “take in snuff.” It will be

remembered that this last phrase occurs in Shakspeare's Henry IV. (Part I., Act i., sc. 3) in immediate connexion with a small box containing perfume, as displayed by the courtier who enraged Hotspur :—

"He was perfumed like a milliner ;
And, 'twixt his finger and his thumb, he held
A Pouncet-box, which ever and anon
He gave his nose, and took 't away again ;
Who, therewith angry, when it next came there
Took it in snuff."

The word pounce, out of which is formed pouncet-box, is supposed to have been remotely derived from *poisonner*, to prick or pierce, and hence the claws of a hawk were called his pounces ; and pouncings, as a term relating to costume, were regarded as ornaments executed by a roll of points, or in open-work. A pouncet-box, therefore, signifies a small box having a perforated cover, containing perfumes, the scent of which escaping through the open flower-work of the top, was regarded in the sixteenth and seventeenth centuries as a preservative against contagion or poison. From the pouncet-box the perfumes, whether moist or dry, were inhaled into the nostrils ; but it was probably not until a century after the general encouragement of tobacco in England that the finely-granulated leaf became commonly established as a pungent perfume, and at length introduced the costly and elegant snuff-box.

So early, however, as the beginning of the reign of James I., a "taker of tobacco" was to be furnished with an apparatus greatly resembling that of a modern Scotch mill, when supplied with all its accustomed instruments, like the ram's-head boxes mounted in gilt silver, and displayed in several parts of the Great Exhibition ; as that, for instance, in Class I., No. 25 ; Class XXIII., No. 46 ; or the still finer example, No. 26, which was considered worthy of Honourable Mention by the Jury of that Class. "Before the meat come smoking to the board," says Dekker, in his *Gull's Hornbook*, in 1609, "our gallant must draw out his tobacco-box, *the ladle for the cold snuff into the nostril*, the tongs and priming-iron, all which artillery may be of gold or silver, if he can reach the price of it." Both the practice and apparatus of taking snuff are described by Howell, in 1646, as quite common in other countries ; since he says, "The Spaniards and Irish take tobacco most in powder or smutchin, and it mightily refreshes the brain ; and I believe there's as much taken this way in Ireland as there is in pipes in England. One shall commonly see the serving-maid upon the washing-block, and the swain upon the ploughshare, when they are tired with labour, take out their boxes of smutchin, and draw it into their nostrils with a quill ; and it will beget new spirits in them, with a fresh vigour to fall to their work again."

There is very little information extant concerning the older receptacles for snuff. In the Appendix to Volume XIII. of the *Archæologia*, published by the Society of Antiquarians (p. 395, plate xxiv.), is an engraving of two small carved cruets, found under a staircase in the Tower of London, which were exhibited to that Society in November 1797. In their general form they very much resembled powder-flasks, and were about 2½ inches in length, and 2 inches in width ; but they were provided with screw-stoppers, to one of which was attached a small spoon. On the exterior they were ornamented with designs representing shooting of birds,

stag-hunting, and bull-baiting, and also French mottoes, evidently stamped from a mould, as if they had been formed of leather softened in hot water; but the materials of which these bottles were made is not stated.

In the extract already given from Howell's *Letters*, it is stated that so early as 1646 even the peasants in Scotland were accustomed to "take out their boxes of smutchin, and draw it into their nostrils with a quill;" which explains the intention of the spoon attached to the cruets referred to, the manufacture of which probably belongs to the early part of the seventeenth century. The word erroneously printed "smutchin" by Howell, is accurately *sneeshin*, a vulgar name for snuff, which causes sneezing: and hence sneeshin-mill (sometimes corrupted into *mull*) is the Scottish name for snuff-box. Dr. Jameson,* from whom these illustrations are derived, adds, that the word mill "is the vulgar name for a snuff-box, especially one of a cylindrical form, or resembling an inverted cone." No other name, he continues, was formerly in use; and the reason assigned for it is, that when tobacco was first introduced into this country, those who wished to have snuff were accustomed to toast the tobacco-leaves before the fire, and then hruise them with a piece of wood in the box, which was thence called a mill, because the snuff was ground in it. From these notices it is easy to perceive how a ram's horn, from its conical shape, became one of the primitive forms of the Scotch snuff-box; although at the present time it is frequently one of the most costly and luxurious. Down to the middle of the eighteenth century, the "sneeshin-horn," with the spoon and hare's foot attached to it by chains, appears to have been regarded as so completely a national characteristic, that when Baddeley played Gibby in *The Wonder*, with Garrick and Mrs. Barry, he came on the stage with such an apparatus.†

In the early part of the eighteenth century in England, fashionable snuff-boxes had probably reached the highest degree of variety and luxury. In *The Tatler*, published on Tuesday, March 7, 1710, several gold snuff-boxes are noticed, which came out last term; but that a new edition would be put out on Saturday next, which would be the only one in fashion until after Easter. "The gentleman," continues the notice, "that gave fifty pounds for the box set with diamonds, may show it till Sunday, provided he goes to church, but not after that time, there being one to be published on Monday, which will cost fourscore guineas." These costly articles, so happily satirized by Steele, are represented as the productions of a fashionable toy-man, named Charles Mather, popularly known under the name of "Buhble Boy."

Every species, however, of metal boxes, together with the "amber snuff-box" of which Sir Plume, in *The Rape of the Lock*, was "justly vain" in 1711, and the boxes made of shells mounted in gold or silver, noticed by Dodsley in 1733, are all belonging to the Reports on the other Classes of the Exhibition. To describe the manufacture of the snuff-box in all its ramifications would require that most of the known arts should be passed in review, as the greater number, not excepting even that of glass-making, have from time to time been subservient to its production. The discussion of these subjects is clearly beyond the province of the Reporters for Class XXIX., the Jurors for which were called upon to judge of such snuff-boxes

* *An Etymological Dictionary of the Scottish Language.*

† *The Gulf's Horn-book*, by T. Dekker; edited by the Rev. J. Nott, 1812, p. 119.

only as are composed of papier-maché, wood, ivory, tortoiseshell, or horn: those made of glass and the various metals belonging to other classes. Notwithstanding this limitation, the Reporters have endeavoured to ascertain the number of Exhibitors who have contributed snuff-boxes in other Classes; but there may be some examples which have escaped their observation.

The manufacture of papier-maché snuff-boxes does not call for any special notice in this place; for although it forms a distinct branch of papier-maché work, its various processes scarcely differ in their details from those universally employed in the making of other articles. It may be remarked that the production of snuff-boxes of this material is chiefly carried on in Germany and France, whence they are exported to most parts of the civilized world.

The manufacture of those very beautiful articles, called Scotch boxes, is the only one calling for especial notice in the present Report. These ingenious productions were originally made in the village of Laurencekirk, by Mr. Stiven,* whose son and successor is present by his works in the Great Exhibition. The art, however, appears soon to have spread to other parts of Scotland: for we are informed that in 1832, in the parish of Old Cumnock in Ayrshire, upwards of a hundred persons, comprising men, women, and children, were employed in the practice of it, and in 1845 there was also an extensive manufactory of wooden snuff-boxes in the town of Mauchline.† In this work, about sixty persons were at that period employed. Judging only by the importance of the contributions to the Great Exhibition from Laurencekirk and Mauchline, it might be inferred that the latter town is at present the principal seat of the manufacture of Scotch wares; which now includes the production of numerous other articles beside snuff-boxes.

In Classes XVII. and XXIX. are examples of covers for books and memorandum-books; paper-knives and book markers; card-cases and card-trays; spectacle-cases; needle-books, thread-reels, crotchet-case, knitting-cases and work-boxes; razor-cases, sheaths for razor-strops, pomatum-boxes, scent-boxes and dressing-cases; egg-cups, tea-caddies; and even candlesticks. To give an idea of the wholesale prices of some of these articles, the following quotations are cited:—Cigar-cases are sold at 42s. per dozen; paper-knives from 10s. to 17s. per dozen, according to size; snuff-boxes from 22s. to 168s. per dozen; and netting-cases at from 5s. per dozen.

The *Scotch Snuff-box*, which has long been renowned for the perfection of its hinge and the close fitting of the cover, is cut out of the solid wood, the description chiefly employed being the sycamore or plane-tree. Mr. W. Chambers states that this is the timber used at Old Cumnock; and that a piece of rough wood which costs 25s. will make snuff-boxes to the value of 3,000l.‡ The first operation consists in making a number of circular excavations in close contiguity to each other, by means of a centre-bit, or a drill running in a lathe; the interior is then squared out by means of gouges and chisels, and is afterwards smoothed with files and glass-paper. The celebrated hinge is formed partly out of the substance of the box and partly out of that of the lid, the greatest attention being paid in its construction to

* *The New Statistical Account of Scotland*, Vol. xi. p. 144.

† *Ibid.*, Vol. v. p. 161. Chambers' *Gazetteer of Scotland*, p. 175.

‡ *Gazetteer of Scotland*, p. 175.

the accurate fitting of the various parts one into the other. The box is lined in the inside with stout tinfoil, and is painted on the outside with several coats of colour, each of which is rubbed down smooth with glass-paper before the succeeding coat is applied. It is then ready to receive the various styles of ornament, which, in some cases, are produced by the hand of the artist, and, in others, by mechanical means. The most usual decoration consists of the tartan patterns, the component lines of which are drawn separately by pens fixed in a ruling-machine on to the box itself, if bounded by planes or slightly-curved surfaces: although such lines were also formerly drawn by means of a rose-engine on *circular* boxes, it is now found a more convenient practice to rule the lines on paper, and then to attach the paper to the boxes. Another style of ornamentation, known by the name of "Scoto-Russian," is of more recent introduction, and imitates, in a remote degree, the beautiful enamelled silver snuff-boxes for which Russia has long been famous. In these, the outside of the box is first covered with stout tinfoil, then completely painted all over the surface, and afterwards placed in the ruling-machine, which traces upon it an intricate pattern of curved and straight lines, by means of a sharp flat tool. This instrument penetrates completely through the paint, but only scrapes the tinfoil, which is left very bright and resembles inlaid silver. Several coats of copal varnish, each of which is successively polished down, are then applied to complete the snuff-box.

In the manufactory of the Messrs. Smith, of Mauchline, which is said to be one of the largest, about Eighty artisans are employed, who have been instructed in the works. The workmen earn from 16s. to 24s. per week, according to their skill and the department in which they are engaged; and the women from 7s. to 9s. per week. An artist capable of making a copy of an oil painting earns 30s. per week.

AUSTRIA.

There are Two Exhibitors of snuff-boxes in the Austrian Section, one of whom, P. BIGAGLIA, No. 600, has contributed some beautiful specimens composed of a sparkling glass, called Artificial Aventurine: which is a silicate of oxide of copper, wherein part of the oxide of copper has been reduced to the metallic state by processes which are kept secret. The reduced copper exists in the form of minute crystals, which, under the microscope, present a most splendid appearance. Although mention is here made of these articles, they really belong to Class XXIV. The other Exhibitor has sent examples of Papier-maché snuff-boxes, glove-boxes, work-boxes, cigar-boxes, spice-boxes, and buttons, which are creditable productions of their class, and remarkable for their cheapness.

CHINA.

In the Chinese Court there is a beautifully Carved Snuff-box, sculptured out of English Cannel-coal, which was taken to China for that purpose by the Exhibitor, Captain SHEA. The carving, which it appears occupied the Chinese artist a fortnight, cost the Exhibitor only 2*l.* sterling. This specimen, however, does not strictly belong to Class XXIX., nor does it represent the snuff-box used by the Chinese. The snuff-box, or rather snuff-flask of China, is in form and size like a smelling-bottle, and is made of rock-crystal, coloured glass, porcelain, wood, and

other materials. To the stopper is attached a small spatula, for the purpose of taking out the snuff, a contrivance which has already been described as formerly in use in England.

BAVARIA.

The contributions from Bavaria, sent by Two Exhibitors, consist of Papier-maché small wares, including Snuff-boxes, which are produced at remarkably low prices, and are exported in very considerable quantities.

BRITISH COLONIES.

The *Indian Courts* contain several examples of Snuff-boxes, the most curious being—the Gourd snuff-boxes, mounted in gold and silver, from Scinde; a snuff-box made from a Cocoa-nut, highly polished; another from the Bilva fruit; and a beautiful specimen made of Buffalo-horn inlaid with metal. *St. Helena* contributes Snuff-boxes made from the willow-tree under which the remains of the great Napoleon reposed until their removal to France, and also from a willow-tree which he planted behind the library at Longwood. From *Van Diemen's Land*, J. MILLIGAN exhibits several specimens, interesting from the variety of the materials of which they are made; comprising a globular snuff-box turned out of the Tooth of the Sperm-whale, which is employed in the colony for stick-heads and similar purposes; a Turned Snuff-box of Iron-wood (*Olea Apetala*); one of the Huron-pine; and one of the Musk-wood of Tasmania (*Eurebia Argophyllum*).

FRANCE.

The beautiful examples of Snuff-boxes in the French Department are as peculiar in their style as the Laurencokirk snuff-boxes in theirs, and the manufacture of them appears to be confined to France, if not to Paris. These boxes, which are quite remarkable for the accuracy with which the hinge is made, and the close fittings of the lid, are usually lined with a veneer of tortoiseshell very highly polished. The outside or body of the box is composed of various materials, as ivory, tortoiseshell, and rhinoceros-horn, and also of petrified wood and other woods, as the maple, the olive, rosewood, and several sorts of palms cut across the grain. Some examples are very tastefully, *not showily*, ornamented with neat gold and silver mounts, but none, perhaps, are more elegant than those made of the palm-tree cut across the grain. Those contributions are from Two Manufacturers, in the excellence of whose work only a very trifling difference was discernible.

GRAND DUCHY OF HESSE.

The examples from Hesse consist of Papier-maché Snuff-boxes, very similar in character to, but not so numerous or various as those of Austria and Bavaria. They were sent by One Exhibitor (No. 61), who has been rewarded for walking-sticks, and is mentioned in the section relating to them in the present Report.

PRUSSIA.

The Snuff-boxes and other articles of small wares sent from Prussia are also entirely of Papier-maché, and are principally imitations of the various descriptions of Scotch, of Tortoiseshell, and Russian boxes. They deserve commendation for the workmanship, but they are higher in price than similar goods sent from Austria and Bavaria. The following are some of the prices which were quoted as those at which the goods are sold wholesale; but judging from the examples from other parts of Germany, they seem rather to be the retail prices:—Snuff-boxes, plain, 15s. per doz.; Marbled boxes, 15s. per doz.; Scotch boxes, 15s. per doz.; Damasked, or engine-turned boxes, similar to the "Scoto-Russian," 15s. per doz.

RUSSIA.

The contribution from Russia is the produce of One manufacturer, and consists of Papier-maché Snuff-boxes, creditably made, but exceedingly high in price. The most common snuff-boxes sell at 2s. 10d., and the dearest at 38s. each; and the cigar-boxes range from 22s. 2d. to 38s. each. In 1842 the Government of Moscow possessed Five manufactories of papier-maché snuff-boxes, which employed Eighty workpeople, and produced goods valued at 3,000*l*.

SAXONY.

From Saxony there is also a contribution of Papier-maché Snuff-boxes, ranging in price from 1s. 10d. each to 2s. 6d., the latter being an imitation of the Scotch box. There are likewise some boxes of buffalo-horn, lined with tortoiseshell, all which productions are commendable for their finish.

TURKEY.

The Snuff-boxes in the Turkish Court consist of three examples:—One of Bituminous-shale, a well-carved Mother-of-pearl snuff-box from Bethlehem, and a box made of Enamelled silver, the latter of which does not, however, belong to this Class.

UNITED KINGDOM.

Independently of the manufacturers who sent the Ram's-head Mull, before alluded to as not belonging to Class XXIX., the Exhibitors of Snuff-boxes are only Four in number, and those deserving of especial mention are contributors of Scotch snuff-boxes. The most important display is that to be hereafter noticed in the List of Awards. The other principal collections are that of Messrs. CLARKE and DAVIDSON, of Class XVII., No 135, and that of Mr. STIVEN, Class XXIX., No 35, which are both deserving of favourable notice.

WURTEMBERG.

The snuff-boxes from Wurtemberg are of two kinds, and were contributed by Two Exhibitors. One of them has sent Papier-maché Snuff-boxes inlaid with mother-of-pearl and imitation gold and silver, which are very commendable as of

the better description of papier-maché work: and the second has supplied some carved Ivory snuff-boxes inlaid with mother-of-pearl, which are also deserving of praise.

The number of Exhibitors of all nations in this division is Twenty-one; of these, there are :—

5	Holders of a Prize Medal.
16	Unrewarded.
21	Total

The classification according to the various countries is as follows :—

Austria (in addition to another Contributor, who exhibits a snuff-box of glass)	-	-	-	-	-	-	-	-	1
China	-	-	-	-	-	-	-	-	1
Bavaria	-	-	-	-	-	-	-	-	2
British Colonies :—India, 1 ; St. Helena, 1 ; Van Diemen's Land, 1	-	-	-	-	-	-	-	-	3
France	-	-	-	-	-	-	-	-	2
Hesse, Grand Duchy of	-	-	-	-	-	-	-	-	1
Prussia	-	-	-	-	-	-	-	-	2
Russia	-	-	-	-	-	-	-	-	1
Saxony	-	-	-	-	-	-	-	-	1
Turkey	-	-	-	-	-	-	-	-	1
United Kingdom (beside Three Exhibitors of Rama'-head Muffs in Classes I. and XXIII.)	-	-	-	-	-	-	-	-	4
Wurtemberg -	-	-	-	-	-	-	-	-	2
Total	-	-	-	-	-	-	-	-	21

LIST OF AWARDS.

ADT BROTHERS, Ensheim (Bavaria, No. 66). Prize Medal, for an assortment of very cheap Papier-maché Small-wares, comprising Cigar-boxes, Glove-boxes, Cigar-cases, Snuff-boxes, and Memorandum-book-covers, which are well manufactured; and although artistic merit is not aimed at, the less elaborate are creditably ornamented.

COLETTA-LEFEBVRE, Paris (France, No. 458). Prize Medal, for beautifully-finished Snuff-boxes made of wood or ivory, and lined with tortoiseshell, and remarkable for the close fitting of the hinge and joint.

HOFRICHTER, C., Reichenau (Austria, No. 644). Prize Medal, for a very large assortment of Papier-maché Snuff-boxes and other Papier-maché Small-wares, comprising 167 varieties, which, taking the price into consideration, are remarkable for their cheapness and goodness of manufacture. As an example of cheapness may be cited the imitation Scotch snuff-boxes, which vary in price from 4*d.* to 7*d.* each.

MERCIER, C. V., Paris (France, No. 1658). Prize Medal, for Tortoiseshell, Palm-tree lined with tortoiseshell, and other kinds of Snuff-boxes, in all of which the workmanship is most excellent; the accuracy of the hinge and the close fitting of the joint being points particularly commendable.

SMITH, WILLIAM and ANDREW, Mauchline, Ayrshire, Scotland (Class XXIX., No. 280). Prize Medal, for a great variety of articles ornamented with Tartan-

patterns, engine-turned patterns ("Scoto-Russian"), and paintings, and comprising Snuff-boxes, Blotting-cases, Cigar-cases, and several other descriptions of Scotch small-wares, which are remarkable for the great accuracy of the workmanship, high degree of finish, and the beauty of the varnish.

E.—MANUFACTURES RELATING TO AMUSEMENTS.

1.—MANLY GAMES.

Cricket and Archery are the only games of skill and strength which are represented to an extent worthy of notice.

Cricket.

UNITED KINGDOM.

The Exhibitors of Bats and other implements used in Cricket are Nine in number, and, as might be expected, they are all British; indeed the articles they contribute are scarcely intelligible to any but Englishmen.

The implements and appliances in the nature of gloves, guards, &c., which the present mode of playing the game, and especially the practice of swift overhand bowling has brought into use, are so various that there is more room for ingenuity in the manufacture of them than might at first sight appear.

The articles contributed by DARK and SONS (197) have great merit. The gauntlets which they exhibit as designed to guard the wrist from the blow of the ball, are lined with slips of cane, and are thereby lighter than those which are thickly wadded or lined with Indian rubber, whilst they furnish a stiffer and more effectual defence against the ball.

So also in regard to the gloves which protect the fingers of the hand that holds the bat: by a tube of Indian rubber fixed along the back of each finger, an improvement is apparent in those exhibited by Messrs. Dark and Sons, inasmuch as a second and smaller tube is fixed within the first, thereby materially increasing the resistance to a blow from the ball without sensibly adding to the weight or diminishing the pliancy of the glove. The Bats exhibited by R. DARK (198) are of excellent wood and very well balanced.

DUKE and SON (No. 191) contributed a collection of all the implements used in Cricket, remarkable for the excellent workmanship and finish which they display.

The number of Exhibitors is Nine; of these, there are—

3 Holders of a Prize Medal.

6 Unrewarded.

9

LIST OF AWARDS.

DARK, MATILDA, and SONS, Lord's Cricket Ground (Class XXIX., No. 197). Prize Medal, for a collection of Bats and Wickets.

DARK, ROBERT, Lord's Cricket Ground (Class XXIX., No. 198). Prize Medal

for Gauntlets, Leg-guards, Spiked-soles, Balls, and other Implements used in the Game of Cricket.

DUKE and SON, Penshurst (Class XXIX., No. 191). Prize Medal, for Implements used in the Game of Cricket.

Archery.

UNITED KINGDOM.

In Archery the British Exhibitors are Five in number.

P. MUIR and AINGE and ALDRED exhibit articles of excellent workmanship. The Bows are well balanced, and the materials from which they are made well selected, some of the woods being of great value and rarity. A bow of Spanish yew, exhibited by the last-named firm, is valued by them at 35 guineas. The Arrows also of both Exhibitors are beautiful specimens of inlaid wood.

BRITISH COLONIES.

There are several contributions of Bows and Arrows from the dependencies of Great Britain, but as they are really used as weapons, they do not belong to Class XXIX. The reader is, however, referred to the following:—*British Guiana*, Nos. 144, 145, and 145A; the *Indian Court*, which contains specimens of Bows and Arrows from Assam; Bows and Arrows from *South Africa*; and several contributions from *Western Africa*.

SWITZERLAND.

One Exhibitor sends a variety of Bows; and a case of Arrows remarkable chiefly for the number of separate pieces of wood of which they are framed. One Arrow is stated to be composed of no less than a thousand pieces.

The number of Exhibitors is Six; of these, there are—

2	Holder of a Prize Medal.
4	Unrewarded.
—	
6	
—	

The classification according to the various countries is as follows:—

Switzerland	-	-	1
United Kingdom	-	-	5
			—
			6
			—

LIST OF AWARDS.

AINGE and ALDRED, 126 Oxford Street (Class XXIX., No. 180). Prize Medal, for Bows, Arrows, and Archery-accoutrements, and also for Fishing-tackle.

MUIR, P., Edinburgh (Class XXIX., No. 150). Prize Medal, for Bows, Arrows, and Archery-implements.

Rackets.

UNITED KINGDOM.

A small selection of Rackets is contributed by One Exhibitor to Class XXIX. The manufacture of these, especially of the heavier and stronger, such as are used in the game of Tennis is better understood in France than in England; indeed, the rackets used in the few Tennis-courts which still exist in England are mostly imported from France.

AWARD.

JEFFERIES, ISAAC, Woolwich (Class XXIX., No. 184). Honourable Mention, for a selection of Rackets which deserve to be mentioned as promising to compete successfully with those of French manufacture.

II.—FISHING-TACKLE.

UNITED KINGDOM.

The articles exhibited under this head are, as might be expected, almost entirely of British manufacture, the sport of angling being but little pursued in other countries, and nowhere with the same study and scientific skill as in the United Kingdom. Probably there is no other country in which the manufacturers of Fishing-tackle constitute a trade in themselves, certainly none in which so much money is annually spent upon the implements which they produce. The British Exhibitors are Twenty-five in number.

The merits of many of their articles, especially of the rods, could not be completely tested within the limits of the Exhibition. The most valuable properties of a rod, consisting in the thorough seasoning of the wood, its capability to resist weather and wear, without warping or twisting, and its retention of an even spring and pliability under constant use, can be ascertained only after prolonged trial; a test which it has not been in the power of the Jurors to apply. The same may, to a great extent, be said of lines, artificial flies, and baits, the durability of which, one of their most valuable and rarest merits, must be proved by experience.

The articles exhibited by C. FARLOW, AINGE and ALDRED, J. K. FARLOW, and JONES, may all claim much credit for execution and high finish. In this respect the only distinction between their work appears to be in the amount and character of the ornaments attached to it. But it should be observed that a profuse expenditure of silver and gilding in the metal-work of a fishing-rod, the application of precious stones to the reels and joints, the inlaying of the butts with ivory and rare woods, and the use of velvet or silk, embossed and gilt, in the place of leather or other more appropriate materials, of which the books and cases for containing fishing-tackle are more usually and properly made, cannot be considered as improvements of the articles in question.

LITTLE and Co. exhibit some improvements which combine practical utility with excellent workmanship. A multiplying reel, in which, by an ingenious arrangement of the cog-wheels (the teeth of the driving-wheel being internal), the handle of the reel retains its place in the centre instead of being fixed, as is usually the

case in multiplying reels, at the edge of the side-plate, thereby being more convenient to wind, and less liable to entangle the loose line. Also an application of sliding rings to the outer ferrules of the joints which are slightly split, and, by the pressure of the rings, made to gripe the inserted joint more closely, whilst the inconvenience of the joints becoming fixed when swollen by wet is obviated. Also a mode of forming and fixing the ferrule on the joints, whereby the sudden transition from *pliant* wood to *stiff* metal, which renders a rod when strained apt to give way in those parts, is in great measure avoided.

AINGE and ALDRED exhibit some spliced rods of excellent construction, each joint being composed of three pieces bound together longitudinally, and thereby less liable to twist or warp, whilst it retains an even spring and elasticity throughout.

J. BERNARD and J. K. FARLOW exhibit articles of considerable merit. Rods similar in construction to those last mentioned, and an improvement in the construction of ferrules; the lower and larger joints being fitted into the upper instead of the upper into the lower. This mode has the advantage that water is less likely to find its way between the joints and make them swell.

FRANCE.

With the exception of some Lines for float-fishing, of very fine and even texture, which are exhibited in the Department of France (141), there is no contribution from Foreign manufacturers.

The number of Exhibitors is Twenty-six; of these there are—

2	Holders of a Prize Medal.
4	Who obtained Honourable Mention.
20	Unrewarded.
—	
26	
—	

The classification according to the various countries is as follows:—

France	-	-	-	1
United Kingdom	-	-	-	25
				—
				26
				—

LIST OF AWARDS.

AINGE and ALDRED, 126 Oxford Street (Class XXIX., No. 180). Prize Medal, for Fishing-tackle and also for Archery implements.

DELAGE-MONTIGNAC, F., Paris (France, No. 141). Honourable Mention, for Fishing-lines.

FARLOW, C., Strand (Class XXIX., No. 176). Honourable Mention, for Fishing-rods, Fishing-tackle, and Artificial Baits.

FARLOW, J. K., Crooked Lane (Class XXIX., No. 181). Honourable Mention, for Fishing-rods and Fishing-tackle.

JONES, J., Jermyn Street (Class XXIX., No. 182). Honourable Mention, for Fishing-rods and Fishing-tackle.

LITTLE, G., and Co., Fetter Lane (Class XXIX., No. 174). Prize Medal, for Fishing-rods, Fishing-tackle, Artificial Baits, and an improved Winch.

III.—TOYS.

One of the most eminent of modern physicists* has remarked that "boys' Toys are the most philosophical things in the world;" and a renowned statesman,† taking another view of their importance, affirms that they are an index to the character of a nation.

In illustration of the first position, a few examples may be cited. A child's kite, in the hands of a Franklin and a Romas, has served to identify lightning with electricity; and conveys an instructive lesson on the composition of mechanical forces. The pea-shooter not only affords evidence of the elastic force of gases, but also of their economical employment when used expansively. The sucker illustrates the weight of the atmosphere, and its equal pressure in all directions; and the sling, the hoop, and the top show the property of centrifugal-force: when the top is in rapid motion, it converts, for the moment, every spot and bruise on its surface into an elegant zone; and thus also imparts a good lesson in physiological optics. To a reflecting mind toys afford ample food for thought; and they might, perhaps, be made to yield much solid instruction to the child, were it not generally far more wise, for a certain period, at least, to limit its inquiries rather to the discovery of the weakest parts of its plaything.

With regard to the assertion that Toys indicate the genius of a nation, it is evident that, as the natural tendency of children is to imitate the employments of their elders, they will always take the most interest in such toys as will assist them in this propensity, and lead them in their sports to do that which they see those around them doing in earnest. Hence, in countries which are of a military disposition, flags, drums, trumpets, guns, swords, and the accoutrements of soldiers, are much in demand for the pastime of even the youngest boys. In a maritime nation toy-ships will be esteemed: and thus the very pastimes of childhood might be made available in furthering the progress of such services as the particular state most requires.

The Exhibition might, therefore, have afforded an interesting opportunity to statesmen and philanthropists for studying the diversity of character exemplified by the contributing nations, had they been all as well represented in their toys as they were in their other manufactures. This, however, was far from being the case, as will be seen from the subsequent detailed Report.

AMERICA.

The only contributions from the United States consisted of India-rubber toys, which belong to Class XXVIII.

AUSTRIA.

The Toy-trade of Austria is exceedingly well and very copiously represented in the Great Exhibition. From Vienna there are Two Exhibitors, one of whom sends a great variety of Automaton-toys; and the other a general collection of ordinary toys, military-accountrements, guns, and swords, holding a very prominent position

* Dr. Michael Faraday.

† Mr. Richard Cobden.

among them. From Bohemia are sent excellent and very numerous examples of those very beautiful boxes of toys for which it is famous, and which form a large item in the export-trade of the country. From the mountains of Tyrol, J. B. PURGER contributes numerous specimens of carved white-wood toys, which are deserving of favourable mention, both on account of their cheapness and the goodness of the workmanship. The specimens supplied by the other Three Exhibitors will be found noticed in the List of Awards.

BAVARIA.

The chief contributions from Bavaria consist of Mechanical toys, which will be noticed in the List of Awards; and also of numerous Magnetic toys, exhibited by J. M. ISSMAVER, which are deserving of commendation for their ingenuity and variety. Both collections are from Nürnberg, in which city large quantities of these descriptions of toys are made for exportation. Besides the Exhibitors of the foregoing specimens are Two others, One of whom sends Dressed-dolls, and the other carved toys, which do not call for any particular comment.

BRITISH COLONIES.

British Guiana sends only a single example. *India*.—The Indian Court contains a very large collection of toys, chiefly from Bengal and Madras. Highly coloured and rude representations of birds* form the greater part of the display; but there are also some instances of toys which are familiar in England, as the humming-top, the merry-go-round, balancing-figures, &c. The collection comprises also several ingenious Malay puzzles, two of which are inclosed in narrow-necked bottles. Figures made in pith are likewise numerous, and are very clever productions. These toys are all such as are in common use in India, on which account they form a most valuable contribution to the Great Exhibition; but they are not nearly so well made as those of Europe. Their selection affords one striking proof, amongst numerous others, of the full appreciation, on the part of the East India Company and its numerous officials, of the objects of the Great Exhibition, and of the great energy and industry displayed by the latter in collecting even the most trivial objects of interest.

FRANCE.

One of the French Exhibitors sends two ingenious Drawing-room ornaments, containing Automaton-birds, which are toys rather for adults than children. Another Exhibitor contributes some excellent Wax-figures for hair-dressers, which are made by processes similar to those employed for producing the best description of dolls; and they are, therefore, enumerated with toys. But although France manufactures enormous quantities of toys of many kinds, only one descrip-

* It would appear from the admired Indian drama of *Sacountalâ*, written by the poet Kâlidâs in the first century B.C., that this kind of toy was even then known, and popular. "Go, I pray," says an attendant, in Act vii., "to my cottage, where thou wilt find a plaything made for the hermit's child Sancara: it is a peacock of earthenware, painted with rich colours."—*Works of Sir William Jones*, vol. vi. p. 302.

tion of them has been sent, and that by a single Exhibitor from Paris, who exhibits dressed dolls only. "In that capital alone," according to the *Statistique de l'Industrie à Paris*, says M. Natalis Rondot, "there were, in 1847, no less than 371 manufacturers of children's toys, employing 2,099 workpeople (641 men, 1,345 women, 80 boys, 33 girls), who, in that year, produced 172,800*l.* worth of goods." The men earn, on the average, 2*s.* 8*d.* per day, and the women 1*s.* 3*d.* per day; but some of the men earn 2*s.* 9*d.*, 3*s.* 2*d.*, 4*s.* 9*d.*, according to their skill, or the description of work they are employed on. Many of the masters employ only a single assistant, or work alone, and very few employ more than ten assistants. Thus, of the 371 manufacturers, only 62 employed more than 10; 142 employed from 2 to 10; 77 employed 1; and 90 employed no assistant, but did all the work with their own hands. Competition has, it appears, brought down prices so low, that dressed-dolls, including a bonnet, are to be bought for *eightpence per dozen*; and undressed composition dolls at *twopence halfpenny per dozen*. It is to be regretted that none of the very excellent automaton toys, boxes of games, of kitchen utensils, &c., find a place in the French Department, as these are exported from France to a considerable extent. Swords, guns, helmets, and other military accoutrements, are also, as might be expected, produced in large quantities in that country; but are disposed of chiefly for the home-trade. Most of the toy-guns are beautifully made, and are generally furnished with percussion-locks, which will fire off a cap. Conjuring-toys, for adults as well as children, ought most certainly to have been exhibited, as in the manufacture of these articles Paris has no rival. The nature of the Toy-trade in Paris is thus given by M. Natalis Rondot:—

Number of Masters.	Number of Workpeople employed.	Nature of Goods manufactured.	Value.
24	126	Military Toys - - - - -	£. 13,346
90	805	Dolls - - - - -	48,358
25	151	Card-board Toys, games, boxes - - -	15,782
12	123	Automaton and mechanical Toys - - -	13,180
24	139	Masks - - - - -	8,496
16	42	Papier-maché animals - - - - -	5,431
16	43	Wooden carriages and horses * - - -	4,426
50	94	Balls, kites, and turned Toys - - -	8,661
10	62	Toys of tin-plate and iron-plate, as kitchen utensils, &c. - - -	9,240
104	514	All other kinds - - - - -	45,880
371	2,099		172,800

TOYS EXPORTED FROM FRANCE.

Years.	To England.	All parts.	Valued at
	Cwt.	Cwt.	£.
1830	197	1,585	12,661
1835	174	2,562	20,822
1840	494	3,018	24,525
1845	697	5,199	42,250
1850	2,269	8,581	75,652

FRANKFORT.

J. V. ALBERT exhibits, amongst philosophical apparatus, Dolls and the Moor's-head conjuring-toy, which admits of a knife traversing the neck without severing the head. The mechanism by which this is effected, though simple, could not be made clear without a diagram.

HAMBURG.

The only contribution consists of Heads for dolls made of papier-maché and wax, which call for no comment farther than that they are largely exported to England and other countries.

PRUSSIA.

The principal Toys in the Prussian Department are those of Pewter from Berlin, which are noticed in the List of Awards. Besides these there are specimens of dressed and undressed dolls (No. 256); also a toy-goat, and a horse, of large size, both being covered with the natural skin of these animals (No. 253). A. FLEISCHMANN, of Sonnenberg (who made the Model of Gulliver, exhibited in Class XXIX.), sends a "Philharmonic chandelier." This very humorous production represents M. Jullien, in the centre at the top, with the performers of his band seated round the circles of the candelabrum, in a great variety of quaint and expressive attitudes; their features and varied action being portrayed with much skill and humour.

SAXONY.

The contribution consists of a few Toys and busts made in pewter. Yet in 1846 there were Six hundred and ninety-seven manufactories of wooden toys, which employed Fifteen hundred and twenty workpeople.

SWITZERLAND.

There are not any carved white-wood toys exhibited in the Swiss Department, excepting some beautiful small models of cottages, which cannot properly be classed under this category; and which, indeed, were not brought under the notice of the Jury for Class XXIX. And as the two examples about to be mentioned are not really children's toys, Switzerland must be deemed to be quite unrepresented in this branch of manufacture. L. AUDEMARS sends a beautiful little pistol, weighing only half a grain, and, consequently, so small that it requires a microscope to bring out its details. When it is magnified about twenty times linear, all the various parts may be distinctly seen, and they then appear beautifully formed and perfect in their polish. Every part is, indeed, as complete and perfect as it is to be found in an ordinary percussion-pistol, so that the lock acts when the trigger is pulled. The second contribution is a Mechanical singing-bird from another Exhibitor, and will be found noticed in the List of Awards.

UNITED KINGDOM.

Although the number of Exhibitors of toys in Classes XXIX. and XXX., whose contributions have been examined by this Jury, is Twenty-one; yet, as the greater part of their productions consists of large models and other special objects, the United Kingdom is scarcely represented in Toys properly so called. Even of

Wax-dolls, which are made in this country in considerable numbers, there is only one contribution (Class XXIX., 122) worthy of notice; and this will be found described in the List of Awards. Rocking-horses are exhibited by J. C. DEAR (Class XXIX., 128); and H. LUCAS (127) sends an improvement on the Garden-horse, which is made to rock by means of the motion of one of the wheel-axes as the horse is dragged along. A few Compressible-toys are exhibited (216); and a variety of Automaton and other toys, chiefly foreign, are displayed by A. BOUCHET (124). With respect to the models already referred to, those exhibited at (126) will be noticed in the List of Awards. The others, which are worthy of favourable mention, are:—a landscape, with clockwork giving motion to a railway train, &c., contributed by J. T. CRIBB (Class XXX., 146); another mechanical landscape picture, by J. L. BARRITT (Class XXX., 339); and the model of an English villa (Class XXX., 213), exhibited by M. A. SMITH. None of the ordinary strong toys of English manufacture are contributed, probably on account of the makers of these sorts being generally very poor. For most of the English wooden-toys are constructed by chamber-masters, who seldom manufacture goods to order; but, on the contrary, when they have produced a small number, hawk them about from shop to shop, or vend them in the streets. Without capital, and compelled to work almost literally from hand to mouth, they continue to exist only, without any material advance, but making much the same kinds, having the same general degree of merit one year after another. That this is no exaggeration, must be conceded by every one who will recalc to mind the toys of twenty years since, and mentally contrast them with those of the present day. That the progress has been slow, and requires long intervals for comparison to make it apparent, arises from the fact that all the improvements must be made in the few leisure moments of the workmen, who are compelled to labour many hours each day to gain a livelihood, and who, probably, cannot even afford the time to carry out any suggestions which may be made to them. That the poor workman does, nevertheless, endeavour to improve in his productions, is shown by Mr. Dickens, with touching humour, in *The Cricket on the Hearth*, when Caleb is made to say, "You couldn't have the goodness to let me pinch Boxer's tail, mum, for half a moment, could you?" When surprise is expressed at the question, he thus explains his meaning: "Oh, never mind, mum; he mightn't like it, perhaps. There's a small order just come in for barking-dogs; and I should wish to go as close to natur' as I could, for sixpence. That's all. Never mind, mum." Dolls'-houses, shops, brewers'-drays, waggons, common horses, the body formed of a sort of skittle with a slice cut off on the under side, and four round pins for the legs, are made in large quantities in England. Spades, wheelbarrows, garden-rollers, garden-rakes, skipping-ropes, caoutchouc-balls, tops, kites, and similar toys, are also made in great numbers. Wax or composition dolls are made entirely in England, but wooden-dolls are imported, as are also papier-maché dolls'-heads, the bodies only being made in this country.

That very large quantities of boys' Marbles are also annually imported, we learn from the Hull collection (290), in reference to which it is stated, that 1,600 cwt. of these articles were entered at that port during the year 1850.

As toys are among those foreign productions which come under the category of "Goods Non-enumerated," the Reporters are unable to give a detailed account of

the various kinds which are brought into England; but the following list will show the extent of this trade, with respect to the various countries which send their toys hither. The Hansatic Towns, it must be remembered, represent Wurtemberg, Bavaria, and other parts of Germany.

Value of toys of all sorts Imported into the United Kingdom in the year 1850:—

From	£.
Denmark - - - - -	323
Hansatic Towns - - - - -	33,628
Holland - - - - -	6,201
Belgium - - - - -	1,056
France - - - - -	4,209
Other parts - - - - -	513
From all parts - - - - -	<u>46,130</u>

WURTEMBERG.

Immense quantities of toys are manufactured in Wurtemberg, more particularly on the borders of the Black Forest, and are exported to England, America, and other countries. The contributions in the Exhibition comprise most of the kinds which are manufactured in that country; as, for example Mechanical-toys (98), which are noticed in the List of Awards; boxes of miniature-tools, kitchen-utensils, &c., made of copper, most beautifully finished, the latter being exhibited by F. BUEHRER (59), with other things not belonging to this class. There are also kitchen, stable, and garden implements (96); pewter and glass toys (94 and 95); dolls' houses (97); and, lastly, two collections of very beautiful miniature ivory-work. One of these is exhibited by F. SCHMIDT (83), and although less important than a similar display (82), to be noticed in the List of Awards, is deserving of commendation for the excellence of the workmanship.

The number of Exhibitors from all parts is Fifty-one; of these, there are—

12	Holders of a Prize Medal.
2	Who obtained Honourable Mention.
37	Unrewarded.
<u>51</u>	Total.

The classification according to the various countries is as follows:—

Austria - - - - -	4
Bavaria - - - - -	4
British Colonies and British Guiana 1 }	2
" India . 1 }	
France - - - - -	3
Frankfort - - - - -	1
Hamburg - - - - -	1
Prussia - - - - -	4
Saxony - - - - -	1
Switzerland - - - - -	2
United Kingdom (including 8 in Class XXX.) -	21
Wurtemberg - - - - -	8
Total - - - - -	<u>51</u>

LIST OF AWARDS.

ALLIX, A. J., Paris (France, No. 6). Prize Medal, for Hair-dressers' Wax Figures. These are modelled with considerable skill, and present a very life-like appearance; the hair, eyelids, and eyelashes being inserted singly in the wax in such a manner as very faithfully to represent nature. Although these models cannot be strictly considered as belonging to toys, yet their manufacture so closely resembles that of doll-making, that they are noticed in this place.

BAUTTE, T. F., Geneva (Switzerland, No. 236). Prize Medal (*Honourable Mention accorded by the Jury of Class XXIII.*), for a Paper-weight of gold, the base being ornamented with scenery painted in enamel. From this a stem ascends, and is surmounted with a small casket which opens and closes by means of clock-work. When the cover is turned back a most beautiful and perfect little bird is discovered, which is apparently singing, and at the same time fluttering its minute wings, and twirling about in different directions. As soon as the song is finished the box closes. The bird is scarcely three-quarters of an inch long, yet is most life-like in the details of its construction and its movements; and its warble is perfectly suited in compass to its size. The manufacture of such minute pieces of mechanism is most valuable training for the watchmaker, and they are therefore deserving of encouragement.

BONTEMS, —, Paris (France, No. 430). Prize Medal. The articles exhibited are of the same class as that just noticed, but considerably larger, the object being of the size of nature. They consist of two groups of Humming-birds, with clock-work movements, by which the birds are made to hop from one twig to another, at the same time opening their wings; after which they twirl suddenly round, and hop back again exactly in the manner of real birds confined in a cage. There is also a continual chirping, apparently kept up by the birds, their beaks being made to move. The levers which carry them backwards and forwards are ingeniously concealed in slits formed in the artificial branches. Other birds are represented continually pecking at beetles. The price of one of these groups of automata is 12*l.*, and of the other with the clock, 18*l.* Both groups are under glass shades, and form singularly pleasing drawing-room ornaments.

BOUCHET, A., Baker Street (Class XXIX., No. 124). Honourable Mention. The Toys exhibited consist of children's Armour, French boxes of Games, a representation of the Great Exhibition, with moving figures, Shops, and various Dolls.

EICHNER, G., Nuremberg (Bavaria, No. 80). Prize Medal, for Twenty Mechanical toys. These articles, which are made of tinned iron-plate and painted, are quite remarkable for the neatness with which they are finished. They consist chiefly of Carriages with horses, the latter being moved by cranks and levers connected with the wheels. The following specimens are deserving of especial notice:—A Carriage with a pair of horses, 2*4s.*; a Carriage with four horses, the carriage containing figures representing Her Majesty and Prince Albert, 40*s.*; a State-carriage, 48*s.*; a Sportsman's-carriage, 6*s.* 6*d.*; and another similar specimen, 4*s.*

HALLER's, J., WIDOW and SON-IN-LAW, Vienna (Austria, No. 652). Prize Medal, for a collection of upwards of Three hundred Children's Toys, comprising

Dolls, dressed and undressed, miniature Furniture, Shops, Drums, Flags, Swords, Guns, Lances, Shakos, Helmets, and other military accoutrements for children, the commoner descriptions of Mechanical-toys, many of which display much ingenuity. There are also numerous other sorts of toys in this collection, which are arranged in the manner of a trophy, and form the largest group in the Exhibition.

JUMEAU, P., Paris (France, No. 1282). Prize Medal for Dolls-dresses. The dolls on which these dresses are displayed present no point worthy of commendation, but the dresses themselves are very beautiful productions. Not only are the outer robes accurate representations of the prevailing fashions in ladies' dresses, but the under garments are also, in many cases, complete fac-similes of those articles of wearing apparel. They might serve as excellent patterns for children to imitate, and thus to acquire the use of the needle, with a knowledge of the arrangement of colours and material; in the latter respects they might indeed afford valuable instruction to adults.

KIETAIBL, F., Vienna (Austria, No. 653). Prize Medal, for a collection of Thirty-nine Automaton Toys. These toys, which are all moved by good metallic clock-work, are most ingenious productions, but they appear to be more expensive than similar manufactures produced in France, with which, unfortunately, the Exhibition afforded no opportunity of comparison. The following are among those deserving of especial notice:—Male and female figures waltzing, 12s., the contrivance for effecting the occasional rapid rotation of the German waltz being very ingenious; a Pianiste (51s.), who plays, or rather appears to play, "God save the Queen" and "Rule Britannia;" an elephant carrying a Howdah; and four walking Indians carrying a palanquin. This collection is the only one of detached locomotive figures.

MONTANARI, AUGUSTA, Upper Charlotte Street, Fitzroy Square (Class XXIX., No. 122). Prize Medal. The display of this Exhibitor is the most remarkable and beautiful collection of Toys in the Great Exhibition. It consists of a series of Dolls, representing all ages, from infancy to womanhood, arranged in several family groups, with suitable and elegant model-furniture. These dolls have the hair, eyelashes, and eyelids separately inserted in the wax, and are, in other respects, modelled with life-like truthfulness. Much skill is also evinced in the variety of expression which is given to these figures in regard of the ages and stations which they are intended to represent. From the prices of these dolls, however, they are adapted rather for the children of the wealthy than for general sale; since the prices of the undressed-dolls are from 10s. to 105s. each; the dressed-dolls, which are attired with much taste, are much more expensive, and vary in price according to the richness of the material of which the robes are made. In a small case adjoining that which contains the toys just enumerated, are displayed several Rag-dolls, which are very remarkable productions, considering the materials of which they are made. They consist entirely of textile fabrics, and the dolls which are intended, and are well adapted for the nursery, are reasonable in price, varying from 6s. 6d. to 30s. per doll, including the dresses.

MÜLLER, C. A., and Co., Oberleutensdorf, Bohemia (Austria, No. 654). Honourable Mention, for nearly Two hundred Boxes of Toys. These boxes are filled with excellent figures representing men and animals, which are modelled in a sort of papier-maché, with trees and rocks, the former being made of wood, and the latter

of paper. The different series representing Hunting-scenes, Zoological-gardens, Herds of cattle, and numerous other groups illustrative of rural domestic life. The truthful delineation of the various animals is a feature deserving of great commendation, as it renders the toys well adapted to afford instruction as well as amusement. The wholesale prices quoted were 11d., 1s. 0½d., 7s. 10d., and 10s. 6d. per box, according to the number and size of the objects contained in it. For instance, the box for 10s. 6d. contained the following objects representing stag-shooting:—3 rocks, 12 large trees, 25 small trees, 17 stags in various positions, 3 huntsmen, and 3 dogs.

ROCK and GRANER, Biberach (Wurtemberg, No. 98). Prize Medal, for a large collection of mechanical and other toys, some made of tinned iron-plate, and others in papier-maché. It comprises: Carriages with horses which are moved by the revolving parts by means of cranks and links; a Water-mill, to be acted upon by real water; a Cascade and fountain, in which, also, real water is to be used; a working-model of a pump; collections of kitchen utensils, a complete set containing many pieces being charged 6s. 8d.; and numerous other articles.

SÖHLKE, G., Berlin (Prussia, No. 265). Prize Medal, for a collection of Pewter-toys; the principal example being a representation of the review at Windsor, on the occasion of the visit to England of the Emperor of Russia, who is portrayed among the numerous figures which this well-executed model contains. Besides this specimen, there are several miniature Dinner and Tea services, also cast in pewter.

SPURIN, E. C., New Bond Street (Class XXIX., No. 126). Prize Medal, for two Models, one representing an English farmyard, and the other Gulliver in Lilliput. The Farm-yard is an ingenious model, representing with fidelity the various buildings and the every-day business of such a place; as the feeding of poultry, pumping of water for cattle, thrashing of corn by horse-power, winnowing of grain, &c.: the various figures being moved by clock-work.

The second model was executed by A. Fleischmann of Sonnenberg, who also exhibits a comic chandelier in the Prussian Department. It represents one of the incidents in Swift's well-known romance, when Gulliver wakes in the country of Lilliput, and finds himself "unable to stir." "As I happened," he continues, "to lie on my back, I found my arms and legs were strongly fastened on each side to the ground, and my hair, which was long and thick, tied down in the same manner. I likewise felt several slender ligatures across my body, from my arms-pits to my thighs." Such an incident affords ample scope for the imagination of the artist, and he has proved himself quite equal to the undertaking. There is much humour evinced in the physiognomy and expression and action of the Lilliputians, some of whom are bold enough to push their inquiries so far as to pry into Gulliver's waistcoat-pockets, a piece of temerity which is high costing one philosopher-looking individual his life. Others of the natives, however, are far more cautious, and mounted, in fancied security, upon the branches of trees which Gulliver might blow down with a breath, they content themselves with a more distant view of him: others again prefer trusting to the ground and their own legs, and some of them are already on the start at the first signs of waking on the part of the man-monster: some slow, dull-headed individuals, not knowing

what is taking place, are eagerly climbing up on his body, whilst others are precipitately sliding down; and even the Lilliputian horses seem to have their presentiment of danger, and are becoming unmanageable.

WITTICH, KEMMEL, and Co., Geisslingen (Wurtemberg, No. 82). Prize Medal, for upwards of Two hundred Bone and Ivory small-wares. The chief part of this collection consists of very small and exquisite Models of furniture, in which there are much minute piercing and carving which, in this respect, exhibit great skill on the part of the workman: these miniature works are much used as chimney-ornaments in Germany. There are also numerous children's Toys: as, rattles, 6½d. each; splicans, 2s. the set, in which those with figures are fairly carved, considering the nature of the goods and their prices. Umbrella and stick-handles form also an item of these productions, and present several examples of good carving, as, for instance, one representing bears climbing a pole, valued at 22s. Lastly, there are several small articles, such as ladies' brooches, and ladies'-companions or cases, containing bodkins, crochet-needles, &c., which are sold for 1s. each. The whole of the productions are well manufactured, and reasonable in price.

F.—MISCELLANEOUS.

In addition to the various manufactures already noticed in the previous remarks, there are productions from no less than Eighty Exhibitors of so miscellaneous a character that they do not admit of being classified under any one of the numerous subdivisions already specified. Of these, however, it must be remarked that braid, sewing-cotton, felt, wire-buttons, bone-buttons, pins, needles, fish-hooks, printers' type-cases, black-lead pencils, pencil-tips, large fishing-tackle (including large nets), casks and models of vats, shoemaker's lasts, gig-whips, hot-water and steam-apparatus, sash-line, sheets of woven wool, cotton and worsted bobbins, and the covering for stacks, do not belong to this Class, and were, therefore, not examined by this Jury. Of these various manufactures, there are Twenty-one exhibitors, leaving still Fifty-nine belonging to the present Class XXIX. Of these, there are:—

Prussian	-	-	-	-	-	2
British	-	-	-	-	-	57
Total	-	-	-	-	-	59

The contributions of these Exhibitors were carefully examined, but no Awards were made in their favour. The following, in Class XXIX., are, nevertheless, worthy of notice:—

BURNISHING-STONES.

T. CHAMBERLAIN (231) exhibits specimens of Burnishing-stones for the use of silversmiths, of which both the rough and the finished stones are displayed.

CONFECTIONERS' MOULDS.

LEALE and ALBRECHT (108) exhibit several well-made jelly and cake-moulds.

LETTERS FOR STICKING ON GLASS AND DOOR-PLATES.

H. FLETCHER (240) exhibits Letters to be fixed on glass; and, also, engraved door-plates filled with a composition said not to be liable to crack in the sun, a very valuable improvement which, however, can be only tested by time.

G. LUCAS (277) exhibits brass and zinc door-plates engraved by machinery, and also filled with a composition said to be not liable to crack in the sun, nor to be acted upon by the atmosphere.

GLASS AND EMERY PAPER, AND CLOTH.

BARSHAM, SON, and Co. (213), and R. and H. ROBERTS (215), exhibit excellent specimens of Glass and Emery cloth, and glass and emery paper; and also of the powdered glass and emery of different degrees of fineness, which are used in their manufacture.

ORNAMENTAL PAPER-WORK.

There are several examples of Cut-paper ornaments both in Class XXIX. and Class XXX. The only contribution, however, which need be noticed, is a very beautiful Paper Transparency, representing Chepstow Castle, Monmouthshire, by moonlight, which is exhibited by S. HERBERT (Class XXIX., 301). The effect, which resembles very closely that of the porcelain pictures, is produced by many over-laying sheets of tissue-paper, cut out in the proper form with scissors, a work requiring much patience as well as skill.

WAFERS.

H. THOMPSON (209) exhibits very beautiful specimens of Cameo-wafers, a manufacture, to a great extent, superseded by the very general employment of envelopes having their seal-flaps gummed and embossed.

The remaining contributions are too unimportant to require enumeration in this Report, especially as they are amply described in the *Illustrated Catalogue*.

(Signed)

WARREN DE LA RUE, Ph. D., *Reporter*.

A. W. HOFMANN, Ph. D., *Joint Reporter*.

London, March 1852.

CLASS XXX.

REPORT ON SCULPTURE, MODELS, AND PLASTIC ART.

Jury.

G. Von VIEBAHN, *Chairman*, Zollverein; Privy Councillor in the Department of Commerce at Berlin.

LORD COLBORNE, *Deputy Chairman*, 19 Hill Street, Berkeley Square.

ANTONIO PANIZZI, *Reporter* (Tuscany), British Museum; Keeper of the Printed Books at the British Museum.

C. R. COCKERELL, R.A., Bank of England; Architect.

J. GIBSON, R.A., 7 Tilney Street, Park Lane; Sculptor.

LORD HOLLAND (Tuscany); Minister at the Court of Turin.

COUNT LEON DE LADORDE, France; Member of Institute, &c.

General GEORGE MANLEY, 19 Rutland Gate; formerly Adjutant-General in Rouze.

C. T. NEWTON, British Museum; Assistant in the Antiquarian Department of the British Museum.

A. W. PUOTIN, St. Augustine, West Cliff, Ramsgate; Architect.

LAMBERT A. J. QUELEST, Belgium; Secretary of the Academy of Fine Arts, and President of the Circle-Artistique, Brussels.

RICHARD REDGRAVE, R.A., 18 Hyde Park Gate South, Kensington Gore; Artist.

Y. D. C. SEURMONDT, Holland; late Master of the Mint at Utrecht.

Dr. C. WAAGEN, Zollverein, Director of the Museum of Fine Arts at Berlin.

W. WYON, R.A., Her Majesty's Mint; Medalist.

THE Jury of Class XXX. assembled for the first time on Monday the 12th of May, 1851. In compliance with the instructions received from the Council of Chairmen, the Jury proceeded to elect a Deputy-Chairman, to make arrangements as to the time and place of their future meetings, and to nominate Sub-Committees, who should lay before the Jury detailed reports upon the several points of inquiry specially assigned to them. Lord Colborne was elected Deputy-Chairman; and at a subsequent meeting the undersigned had the honour to be appointed Reporter.

The Sub-Committees having brought their investigations to a close with the utmost despatch consistent with the due performance of the arduous duties intrusted to them, severally laid their reports before the Jury, who, after the most mature and anxious consideration, have agreed upon their awards now submitted to the Royal Commissioners through the Council of Chairmen. As the Jury of Class XXX. forms a group by itself, and is not part of any other group of Juries, its awards have not been submitted to any other Jury or Juries for confirmation, as would otherwise have been the case, according to the 12th Instruction from the Council of Chairmen. The Jury, however, considered it expedient to hold a special meeting as a group, and at that meeting the awards

previously made were reconsidered and finally settled by the Jurors. It is therefore upon the Jury of Class XXX. alone that the whole responsibility of the awards in the Class of Fine Arts rests.

In making these awards the Jury have acted strictly in accordance with the principle laid down by the Council of Chairmen in their 15th Instruction. They have been guided solely by the merit which they have recognized in the individual works exhibited, without reference to countries, and considering the Exhibition as a whole. And in compliance with the 20th Instruction, the Jury of Class XXX. have made the proportion of the Council to the Prize Medal, a very small one. Even had this instruction not been laid down in such precise terms by the Council of Chairmen, the Jury of Class XXX. would have felt it their duty to exercise great reserve in awarding Council Medals, knowing, on the one hand, that superior excellence is but very rarely attained, particularly in such works as fell within their jurisdiction, and being aware, on the other, that it was only "for very pre-eminent merit" that the Great Medal was intended.

It having already been explicitly stated that the Jury in making their awards were guided solely by the merit which they have recognized in the works exhibited, it might be deemed superfluous to add more on this point; there are, however, one or two facts, obvious indeed, but yet of sufficient importance to be recalled to the minds of such persons as might be led by the decisions of the Jury to draw invidious comparisons between one country and another. It is an obvious but most important fact to be borne in mind, that with respect to the principal branch of the subjects falling under Class XXX. (Sculpture), foreigners have laboured under peculiar difficulties in having had to bring over from distant parts, and at considerable expense and risk, statues in marble or bronze for the Exhibition. Again, all foreign artists have not enjoyed the same means of overcoming these difficulties. In many cases their governments have given facilities and assistance towards this object, but, even then, this assistance and these facilities have varied in extent. The Jury could not moreover but feel and regret the absence from the list of exhibitors of the names of some of the most distinguished artists in Europe. It might be invidious to mention individuals, but it would be unjust to pass over the fact unnoticed. Among the works, however, by natives of the United Kingdom, to which Medals have been awarded, there are two deserving notice on account of their being exhibited among the Roman sculptures—a graceful acknowledgement of the advantages derived by the artists from that school on which their eminent success reflects so much credit.

The scope and nature of the works on which the Jury of Class XXX. were called upon to adjudicate, gave to their position and duties a special character, and must necessarily impose a peculiar line of conduct upon the Reporter.

There is no doubt, for instance, that a history, however rapid, of the rise, progress, and present state of most classes of industry represented in the Exhibition, will, in the majority of cases, form a part of, and add considerably to, the value of the several Reports, but to attempt such an historical sketch with reference to the Fine Arts, must, of necessity, prove unsatisfactory and worse than useless. The Jury believe, however, that their awards will give a just idea of the present state of the Fine Arts as shown in this Exhibition; and they here wish to express their gratification in observing the universally growing taste

for objects of art, and the increasing estimation in which they are held. They have noticed with equal pleasure, that industry directed by science fosters this popular tendency. By the novel and successful adaptation of cheap materials and of economical processes to the multiplication of works of art, the best models are daily brought more and more within the reach of all classes. New and pure sources of enjoyment, hitherto the privilege of the few, are thus opened to all the members of civilized society. Again, the diffusion of good taste in the Fine Arts cannot but beneficially affect the productions of industry generally, so that what has hitherto been valued merely for its usefulness, may, in many cases, be rendered an object of attraction to a cultivated eye and a refined mind.

The Jury of Class XXX. have been most anxious not to pass over any of the numerous objects in the Exhibition, which it might properly be considered to be their duty to examine. They think it unlikely that any article deserving notice should have escaped their repeated, minute, and diligent inquiries. On the other hand, this Jury have occasionally abstained from examining objects, respecting which, owing to the necessarily uncertain limits of the several classes, doubt might be entertained whether they strictly belonged to Fine Arts or not. Should the Jury of Class XXX. have been led in some few instances to limit their jurisdiction too much, they have the satisfaction of feeling that ample justice has been rendered to exhibitors by those Juries, to whose judgment such objects as have not been considered to belong to this class have been finally submitted. Thus the Jury of Class XXX. have purposely abstained from judging of such metal-casts as they conceived to have been exhibited merely for the purpose of showing either the successful result of a new process, or the novel use of a particular metal. In this case they were aware that another Jury were about to take these points into their consideration, and judge of these objects as specimens of mechanical industry. In some few exceptional cases, such, for instance, as those of Messrs. PEREZ, WEINHAUPT, &c., certain objects have appeared to possess so strong a claim to be noticed in this class, that the Jury have not hesitated to distinguish them by an award, although aware that they had been rewarded by other Juries; but whenever such instances of double awards have been made known to this Jury, the fact has been noticed in this Report.

The Jury would willingly have endeavoured to state, as directed by the 20th instruction of the Council of Chairmen, the several grounds upon which four of the Great Medals have been recommended by them, but it has been found impossible to comply with such an instruction with respect to objects of sculpture, although the Jury felt how desirable it was that such an instruction should be observed in those cases in which the elements out of which the Juries were to form their judgment, were of a more definite and more uniformly appreciable nature.

At a meeting held on the 5th of June, long before the question of individual awards came under consideration, the Jury agreed upon the following resolution:—

“That it is not desirable to assign the Council Medal to every object of art pre-eminently beautiful or excellent in its kind, whether it be executed in an inferior section of the Class or not; but that it should be rather limited to the highest works of the highest class.” This resolution, consistent with the view of the Fine Arts taken throughout by this Jury, precluded them from awarding the highest

honours to any hut works of art of the highest class. Their awards must not, therefore, be compared with those of other Juries guided by different principles, but must be tested only by the rules which the Jurors of Class XXX. have laid down for their own guidance. The holders of the several marks of approbation by which this Jury have distinguished merit ought to appreciate them according to the high value set upon these several marks of approbation by those who conferred them.

In forming their judgment upon works in the highest branch of art coming within their jurisdiction, the Jury have principally looked for the embodiment of ideas, thought, feeling, and passion; not for the mere imitation of nature, however true in detail, or admirable in execution. They have looked for originality of invention, less or more happily expressed in that style which has for twenty-three centuries been the wonder of every civilized people, and the standard of excellence to which artists of the highest order have endeavoured to attain. Wherever indications of originality, chastened by a successful adaptation of this style have been met with, the Jury have acknowledged a corresponding amount of merit; and it is this originality of conception improved by such style, which the Jury have recognized by the honours placed at their disposal. They have endeavoured to record in the most emphatic manner their anxious wish that artists should study to give their ideas that form and life which spiritualizes every-day nature, and elevates the work of art to the place of a type of nature itself. The Jury of Class XXX. would point to the remains of the Parthenon as embodying the result of the great principles which they have been anxious to inculcate, and which they desire to see universally adopted. The limited number of Council Medals awarded must not therefore be regarded as a proof of deficiency of talent in the bulk of the works exhibited, but as evidence of the severity with which the principles adopted by the Jury have been applied.

It was agreed to recommend that Council Medals should be awarded to the following works:—

To Professor A. KISS, of Berlin, for his group cast in zinc, and bronzed by M. GEISS, representing an Amazon on horseback attacked by a Tiger. (Prussia, No. 279.)

To Baron MAROCHETTI, of Turin, now of London, for his colossal equestrian statue, in plaster, of Richard Cœur de Lion. (Outside West, 76.)

To M. J. PRADIER, of Paris, Member of the Institute, for his marble statue of Phryne. (France, No. 1407.)

To the representatives of the late Mr. RICHARD J. WYATT, for his marble statue of Glycera. Exhibited by Captain LEYLAND. (Main Avenue East, No. 103.)

It was the unanimous impulse of the Jury on the awards being taken into consideration, to recommend that the same high distinction should be conferred on Mr. GIBSON, for his marble group of a Hunter and Dog, exhibited by the Earl of YARBOROUGH. Their intention was defeated by Mr. Gibson himself, who, well knowing that should he accept the office of a Juror of Class XXX., he could no longer receive a prize from that Jury, preferred serving his brother artists to his own individual gratification, and thus disqualified himself for receiving the honour which he had so well deserved.

DIVISION A.—SCULPTURE AS A FINE ART.*

Section A.—1. In Metals simple, as Gold, Silver, Copper, Iron, Zinc, Lead, &c.

In this section of the works submitted to their judgment, the Jury awarded the Prize Medal to the following work, it being however understood that for this class of reward, when more than one article was exhibited by the same artist, the Jury might, if they thought it expedient, cumulate in their judgment the various species of merit which they recognized in the several productions.

To MESSRS. C. M. WEISHAUPF SONS, of Hanau, for a Set of Chess-men and Board, in silver and gold, ornamented with enamel. Although aware that the merit of these articles has been acknowledged by another Jury, the Jury of Class XXX. wished to record their opinion of them as objects of art. (Prussia, No. 412.)

The Jury were of opinion that the following artists were deserving of Honourable Mention :—

Mr. A. VECSTE, of London, for his designs for silver works executed by him for the exhibitors, Messrs. HUNT and ROSKELL. Although a Council Medal has been awarded to the exhibitors by another Jury, the Jury of Class XXX. considered it just to record their opinion of the merits of this artist. (Class XXIII, No. 97.)

The Jury of Class XXX. have heard with great satisfaction that another Jury have suitably acknowledged the excellent workmanship of the Shield presented by His Majesty the King of Prussia to H. R. H. the Prince of Wales, on whose behalf it has been exhibited by H. R. H. PRINCE ALBERT. They think it, however, their duty to add that the several eminent artists who have contributed to the execution of the design of Director Cornelius, deserve the special praise of the Jury of Class XXX., for the taste and skill which they have respectively displayed in this work. (Main Avenue East, No. 98.)

Section A.—2. In Metals compound, as Bronze, Electrum, &c.

The following Prize Medals were awarded in this section :—

To Mr. JOHN BELL, of London, for his Eagle Slayer, cast in bronze by the Coalbrook Dale Company. (Main Avenue West, No. 53.)

To M. JEAN DEBAY, of Paris, for his bronze group representing the Death of the Stag. (Main Avenue East.)

To M. FRATIN, of Paris, for a group of Eagles in bronze. (France, No. 1235.)

To M. E. L. LEQUESNE, of Paris (f), for his bronze statue of a Dancing Faun. (Main Avenue East.)

The Jury were of opinion that the following artists were deserving of Honourable Mention :—

M. — BONNASSIEUX, of Paris, for a bronze figure representing Cupid cutting his wings. (France, No. 64.)

* The classification of awards is according to that adopted in the "Head Juries."

M. C. CORDIER, of Paris, for his Head of a Negro in bronze. (France, No. 460.)

Mr. T. KALIDE, of Berlin, for his group in bronze of a Boy with a Swan. (Prussia, No. 285. Prize Medal awarded, Class XXII.)

M. P. J. MENE, of Paris, for his several Animals in bronze. (France, No. 630. Prize Medal awarded, Class XXII.)

M. C. MOELLER, of Berlin, for two bronze groups representing a Boy with a Newfoundland Dog, and a Girl with a Bulldog. (Prussia, No. 292.)

Section A.—3. In Minerals Simple, as Marble, Stone, Gems, Clay, &c.

The following Prize Medals were awarded in this section :—

To Mr. E. H. BAILY, of London, for his two plaster statues of a Nymph preparing for bathing, and of a Youth resting after the Chase. (South Transept, Nos. 6 and 7.)

To Mr. JOHN BELL, of London, for his plaster statue of Viscount Falkland, no Prize Medal was specially awarded, as he had already received one for his "Eagle Slayer," in bronze. (North Transept, No. 28.)

To M. GIO. MARIO BENZONI, of Rome, for his statue in marble representing Gratitude. (Rome, No. 16.)

To M. AUGUSTE DEBAY, of Paris, for his group in marble representing Eve, with Cain and Abel asleep in her arms, and designated as the "Premier Berceau." (France, No. 45.)

To Professor F. DRAKE, of Berlin, for a reduced cast in plaster of part of the marble pedestal to the monument of Frederic William III. of Prussia. (Prussia, No. 273.)

To M. A. ETEX, of Paris, for his various works of sculpture in plaster and marble. (France, No. 1215.)

To Mr. J. H. FOLEY, of London, for his plaster statue of a Youth at a Stream; also for his plaster group representing Ino and Bacchus. (North Transept, No. 47, Sculpture Court, No. 19.)

To M. I. FRACCAROLI, of Verona, for his two statues in marble, representing Achilles wounded, and David slinging the stone. (Austria, No. 710.)

To M. C. A. FRAIKIN, of Schaerbeck, near Brussels, for a plaster group of Psyche carrying off Cupid. (Belgium, No. 465.)

To M. A. GALLI, of Milan, for his marble statue of Susannah. (Austria, No. 711.)

To M. G. GEEFS, of Schaerbeck, near Brussels, for a plaster group representing a Lion in love. (Belgium, No. 466.)

To Mr. J. HOGAN, of London, for his reclining figure in plaster representing a Drunken Faun. (Sculpture Court, No. 14.)

To Mr. B. JENNINGS, of London, for his marble statue of Cupid. (Sculpture Court, No. 81.)

To M. J. A. JERICHAU, of Copenhagen, for a group in plaster representing a Hunter carrying off the Cub of a Panther. (Denmark, No. 39.)

To Mr. J. LAWLOR, of London, for a statue in plaster representing a Bather. (Sculpture Court, No. 22.)

To M. A. LECHESNE, of Paris, for his two casts in plaster representing two groups of a Child protected from a Snake by a Dog. (Main Avenue East, No. 573.)

To Mr. LAWRENCE MACDONALD, now at Rome, for an Iconic statue in marble. (Rome, No. 18.)

To Mr. P. MACTOWELL, of London, for his plaster statue of Eve; also for his statues of Cupid, and of a Girl at Prayer, in marble. (South Transept, Nos. 22, 23, 24.)

To Mr. WILLIAM C. MARSHALL, of London, for his plaster figure of Sabrina. (Sculpture Court, No. 15.)

To M. RAFFAELLE MONTI, of Milan, for his marble statue of Eve after the Fall. (Austria, No. 746.)

To Mr. HIRAM POWERS, from the United States of America, for a statue in marble representing a Greek Slave. (No. 522.)

To M. J. M. RAMUS, of Paris, for his marble group representing Cephalus and Procris. (France, No. 1419.)

To Professor ERNST RIETSCHEL, of Dresden, for his plaster group designated as "La Pietà," representing Mary kneeling at the Dead Body of our Saviour; and for his bas-reliefs in marble. (Saxony, No. 185.)

To Mr. T. SHARP, of London, for his marble figure representing a Boy frightened by a Lizard. (Sculpture Court, No. 20.)

To M. E. SIMONIS, of Brussels, for his equestrian statue of Godfrey of Bouillon, in plaster; and for other works. (Belgium, No. 464.)

To M. G. STRAZZA, of Milan, for his reclining figure, in marble, representing Ishmael. (Austria, No. 713.)

To Mr. E. THRUPT, of London, for his marble statue of a Boy catching a Butterfly; also for a marble figure representing Arethusa. (Sculpture Court, Nos. 56 and 58.)

To M. J. TIERLINCKX, of Malines, for a statue in marble representing Giotto. (Belgium, No. 456.)

To the REPRESENTATIVES of the late Mr. M. L. WATSON, of London, for his marble statue of the sculptor Flaxman, exhibited by Mr. Franks; and for his two statues, likewise in marble, of the first Earl of Eldon, and of his brother Lord Stowell, exhibited by the present Earl of Eldon. (Sculpture Court, No. 60, and Main Avenue West, No. 81.)

To M. ALBERT WOLFF, of Berlin, for his marble group of a Girl with a Lamb, representing "Innocence." (Prussia, No. 307.)

The Jury were of opinion that the following artists were deserving of Honourable Mention:—

Mr. WILLIAM BEHNES, of London, for his marble statue representing a Startled Nymph. (Sculpture Court, No. 54.)

M. H. W. BISSEN, of Copenhagen, for his plaster statue of Orestes, and for other sculptures. (Denmark, No. 38.)

M. T. CLESINGER, of Besançon, for his marble figure of a Bacchante. The Jury, for reasons totally independent of the acknowledged merits of this young artist, abstained, with regret, from awarding a high mark of approbation to this work. (France, No. 419.)

Professor A. COSTOLI, of Florence, for a marble statue of a Dying Gladiator,

exhibited by the Rev. John Sandford.* The work by the same artist described under Tuscany, No. 106 of the General Catalogue, was not exhibited.

Mr. J. ENGEL, from Hungary, for his marble group representing an episode in the history of the war between the Amazons and the Argonauts. (South Transept, No. 15.)

Mr. P. FRECCIA, of Florence, for his marble statue of Psyche. (Tuscany, No. 110.)

Mr. J. GEEFS, of Antwerp, for his plaster statue, "The Faithful Messenger." (Belgium, No. 451.)

Mr. JOSEPH JAQUET, of Schaerbeek, near Brussels, for his plaster statue representing Cupid disarmed. (Belgium, No. 461.)

Mr. J. LEEB, of Munich, for his marble statue of a Girl carrying a Nest of Cupids. (Bavaria, No. 89.)

Mr. L. MARCHESE, of Milan, for his statue in marble representing Eurydice. (Austria, No. 716.)

Mr. F. M. MILLER, of London, for his marble group, "The Orphans." (No. 98A, Main Avenue East.)

Professor L. NENCINI, of Florence, for his reclining marble figure of Bacchus. (Tuscany, No. 108.)

M. MICHEL PASCAL, of Paris, for his model in marble of a Friar presenting the Crucifix to two Children. (France, No. 1660.)

Mr. A. SANGIORGIO, of Milan, for his marble bust of the poet Vincenzo Monti. (Austria, No. 722.)

Mr. E. B. STEPHENS, of London, for his plaster group representing a Deer-stalker and Dog. (North Transept, No. 29.)

Mr. W. THEED, of London, for his sculptures in marble and plaster. (Sculpture Court, Nos. 13, 59, and 79.)

Mr. and Mrs. T. THORNYCROFT, of London, for their statues in plaster of the Royal Children, represented as the Seasons. (Sculpture Court, No. 34.)

M. T. WAGNER, of Stuttgart, for a figure in marble representing Mary Magdalen. (Wurtemberg, No. 108.)

Mr. H. WEEKES, of London, for his marble group, representing a sleeping child and dog. (South Transept, No. 21.)

Section A. 4.—In elaborate Mineral Materials, as Glass, Porcelain, &c.

The Jury made no award in this section.

Section A. 5.—In Woods and other Vegetable Substances.

The following Prize Medals were awarded in this section :—

To Mr. C. GEERTS, of Louvain, for his high relief in wood, representing the Coronation of the Virgin Mary. (Belgium, No. 450.)

To M. J. LIÉNARD, of Paris, for his carvings in wood. (France, No. 1326.) The Jury were aware that the merits of Mr. Liénard had been acknowledged by another Jury. (Council Medal, Class XXVI.)

* This object is not in the Catalogue.

To Mr. W. G. ROGERS, of London, for his cradle, carved in Turkey boxwood. (No. 353.)

To Mr. T. W. WALLIS, of Louth, for his carvings in wood. (No. 89.)

Section A. 6.—In Animal Substances, as Ivory, Bone, Shells.

The Jury were of opinion that the following artists were deserving of Honourable Mention :—

M. L. BIGOTTI, of Lucca, for his bas-reliefs in ivory. (Tuscany, No. 78.)

M. M. HAGEN, of Munich, for his goblet of carved ivory. (Bavaria, No. 83.)

M. C. W. HEYL, of Darmstadt, for his goblet of carved ivory. (Hesse, No. 75.)

M. C. G. KLINGSEY, of Copenhagen, for his ivory jewel-casket, ornamented with bas-reliefs. (Denmark, No. 34.)

M. L. LAUTZ, of Paris, for his ivory carving, representing the victory of Charlemagne over the Saxons. (France, No. 295.)

Mr. R. C. LUCAS, of the Firs, near Winchester, for his ivory carvings. (No. 306.)

DIVISION B.—WORKS IN DIE-SINKING, INTAGLIOS.

Section B. 1.—Coins, Medals, and Models of a Medallion character in any material.

The following Prize Medals were awarded in this section :—

To M. K. FISCHER, of Berlin, for medals. (Prussia, No. 281.)

To Mr. L. C. WYON, of London, for his medals and medallion portraits of the Royal Children, modelled by command of Her Majesty. (No. 286.)

The Jury were of opinion that the following artists were deserving of Honourable Mention :—

M. BERNARD AFINGER, of Berlin, for his medallions. (Prussia, No. 309.)

M. L. J. HART, of Brussels, for his medals. (Belgium, No. 441.)

M. C. JEHOTTE, of Liege, for his medals. (Belgium, No. 447.)

M. C. PFEUFFER, of Berlin, for his medals. (Prussia, No. 286.)

Count T. TOLSTOY, of St. Petersburg, for his medallions. (Russia, No. 328.)

The Jury having the honour to number Mr. W. Wyon, of London, among their members, were prevented from expressing, by their award, the opinion which they entertain of the works exhibited by this distinguished artist.

Section B. 2.—Impressions struck from Dies for Ornamental purposes.

The Jury made no award in this section.

Section B. 3.—Gems, either in Cameo, or in Intaglio, Shell Cameos.

The Jury were of opinion that the following artist was deserving of Honourable Mention :—

M. THOMAS SAULINI, of Rome, for his shell cameos. (Rome, No. 24.)

Section B. 4.—Seals, &c.

The Jury made no award in this section.

DIVISION C.—ARCHITECTURAL DECORATIONS.

Section C. 1.—Integral, in Relief, Colour, &c.

The Jury were of opinion that the following artist was deserving of Honourable Mention :—

Mr. N. J. COTTINGHAM, of London, for his model of a spandril for Hereford Cathedral. (Main Avenue West, No. 63.)

Section C. 2.—Adventitious, as Stained Glass, Tapestry, &c.

The following Prize Medals were awarded in this section :—

To M. G. BERTINI, of Milan, for a painted glass window, representing Dante and some of his ideas. (Austria, No. 737.)

To M. A. GÉRENTE, of Paris, for his painting on glass of the history of Samson. (France, No. 231.)

To Messrs. J. HARDMAN and Co., of Birmingham, for their painted glass windows. (Class XXVI., No. 532.)

To M. S. KELLNER, of Nuremberg, for a copy in painted glass of a window by Volkamer, in St. Lawrence's church in that city. (Bavaria, No. 86.)

To Messrs. MARECHAL and GUYNON, of Metz, for their painting on glass, representing St. Charles administering the Communion to the plague-stricken. (France, No. 329.)

The Jury were of opinion that the following artists were deserving of Honourable Mention :—

M. P. BAGATTI-VALSECCI, of Milan, for his painting on glass. (Austria, No. 616.)

Messrs. CHANCE BROTHERS, and Co., of Birmingham, for their painted window-glass. (Class XXIV., No. 60.)

Messrs. HOLLAND and SON, of Warwick, for their life of Christ painted on glass. (Class XXIV., No. 63.)

Mr. J. G. HOWE, of London, for his imitation of ancient painted window-glass. (Class XXIV., No. 67.)

M. A. LUSSON, of Paris, for his painted glass window. (France, No. 565.)

Mr. GEORGE MYERS, of London, for the tomb in stone of Bishop Walsh. (Class XXVI., No. 533.) (Prize Medal, Class XXVII.)

Messrs. M. and A. O'CONNOR, of London, for their painted glass. (Class XXIV., No. 65.)

The Jury gladly seize the opportunity which now offers itself of rendering justice to the taste displayed by their colleague Mr. Pugin in the arrangement of the Mediæval Court in the Exhibition.

Mr. W. WAILLES, of Newcastle-upon-Tyne, for his painted glass for York Cathedral. (Class XXIV., No. 73.)

To the GOVERNMENT MANUFACTORY OF Gobelins and Beauvais Tapestry the Jury award a Council Medal jointly with Class XIX.

DIVISION D.—MOSAICS AND INLAID WORKS.

Section D. 1.—In Stone.

The following Prize Medals were awarded in this section :—

To the CAVALIERE BARBERI, of Rome, for a mosaic table, designed and executed

by him, representing views of celebrated cities in Italy. (Rome, No. 15. Council Medal, Class XXVII.)

To Mr. G. BIANCHINI, of Florence, for his tables in pietra dura, one of them exhibited by R. S. Holford, Esq., and not entered in the Catalogue, the other entered (Tuscany, No. 113). The Jury were much pleased to learn that the merits of this distinguished artist, with respect to the second table, had been suitably acknowledged by another Jury. The table described under No. 111, in the same page of the Catalogue, has not been exhibited.

To M. RAFFAELLE CASTELLINI, Royal Manufactory of St. Peter's, Rome, for his copies in mosaic of a medallion portrait of Boniface II., by Bompiani, and of the head of St. John the Baptist, by Guercino. (Rome, No. 23.)

The Jury were of opinion that the following artists were deserving of Honourable Mention :—

M. BENEDETTO BOSCHETTI, of Rome, for two mosaic tables. (Rome, No. 17. Prize Medal, Class XXVII.)

M. DOMENICO MOGLIA, of Rome, for his mosaics. (Rome, No. 21. Honourable Mention, Class XXVII.)

The CAVALIERE LUIGI MOGLIA, of Rome, for his mosaic view of the Temples of Paestum. (Rome, No. 20. Prize Medal, Class XXVII.)

M. ANTONIO ROCCHIGIANI, of Rome, for his mosaic view of the Temples of Paestum. (Rome, No. 22.)

Section D. 2.—In Tiles.

The Jury made no award in this section.

Section D. 3.—In Vitrified Materials.

The Jury made no award in this section.

Section D. 4.—In Wood.

The following Prize Medal was awarded in this section :—

To MM. PEREZ and Co., of Barcelona, for an octagonal table of inlaid wood. The Jury have heard with pleasure, that the distinguished merits of this work have been suitably acknowledged by another Jury. (Spain, No. 271A.)

Section D. 5.—In Metal.

The following Prize Medals were awarded in this section :—

To M. J. FALLOISE, of Liege, for various inlaid objects. (Belgium, No. 384. Prize Medal, Class XXIII.)

To M. J. ROUCOU, of Paris, for his inlaid work. (France, No. 1689.)

The Jury were of opinion that the following artists were deserving of Honourable Mention :—

Messrs. S. H. and D. GASS, of London, for a niello bracelet, designed by Mr. Maclise. (Class XXIII., No. 83.)

The ROYAL ORDNANCE MANUFACTORY, of Toledo, for various inlaid arms. (Spain, No. 266.)

M. E. ZULOAGA, of Eibar, for his inlaid ornaments on pistols and other arms (Spain, No. 264A. Prize Medal, Class XXIII.)

DIVISION E.—ENAMELS.

Section E. 1.—On Metals.

The following Prize Medals were awarded in this section :—

To M. — BONNET (of Paris ?) for the head of St. John, in enamel. (France, No. 1369.)

To Mr. W. ESSEX, of London, for his enamel paintings. (No. 241.)

To M. — HAMON, of Paris, for an enamelled casket. (No. 1369.)

To Madame PAULINE LAURENT, of Paris, for her three enamels in copper, two after Raphael, and one representing Venus. (France, No. 1369.)

The Jury were of opinion that the following artists were deserving of Honourable Mention :—

Mr. W. C. BELL, of London, for his enamel painting of the "Ecce Homo," after Correggio. (No. 249.)

Mr. H. P. BONE, of London, for his enamel paintings on gold. (No. 238.)

Mr. J. HASLEM, of London, for his enamel paintings on gold. (No. 237.)

Section E. 2.—On China.

The following Prize Medals were awarded in this Section :—

To M. ANTOINE BÉRANGER, of Paris, for his portrait of Prince Albert, life-size, painted on china, after Winterhalter. (Main Avenue East, No. 97.) Also for a Head, painted by him on china, after Rubens. (France, No. 1369.)

To M. H. BUCKER, of Dresden, for his paintings on china. (Saxony, No. 176.)

To M. J. DIETERLE, of Paris, for the general good taste displayed in the painting of china in the Manufactory of Sèvres, of which he is co-director. (France, No. 1369.)

To Mme. A. DUCLUZEAU, (of Paris ?) for her portrait of Her Majesty, life-size, painted on china, after Winterhalter. (Main Avenue East, No. 96.) Also for her painting of a Holy Family, on china. (France, No. 1369.)

To M. JACOBBER, of Paris, for his paintings of flowers on china, after Van Huysum. (France, No. 271.)

To Mme. JACOTOT, of Paris, for the Head of Raphael, painted by her on china. (France, No. 1369.)

To M. N. KORNILOFF, of St. Petersburg, for a landscape after Berghem, on china; executed at the Imperial China Manufactory, St. Petersburg. (Russia, No. 318.)

To M. — SCHILT, of Paris, for his painting on a china vase. (France, No. 1369.)

To M. O. WUSTLICH, of Bamberg, for his portrait of Charles IX. on china. Exhibited by Mr. SCHMIDT. (Bavaria, No. 92.)

The Jury were of opinion that the following artists were deserving of Honourable Mention :—

Mr. — BRADLEY, of Stoke-upon-Trent, for his painting of Ducks on china, exhibited by Mr. COPELAND. (Class XXV., No. 2.)

Mr. S. CHESTERS, of London, for his specimen of painting on china, after Murillo. (No. 246.)

MM. ECKELMANN and WÜSTLAH, for their portraits of the Queen with the Prince of Wales, and of Prince Albert, painted on china from miniatures after Thorburn. (Main Avenue West, No. 140.)

MM. F. E. HENNEBERG and Co., of Gotha, for their paintings on china. (Prussia, No. 772.)

M. MARIETTE DE CHASSAGNE, for a painting on china after Horace Vernet, exhibited by M. Boyer, of Paris. (France, No. 1554.)

M. — NIGO, for a Flower-piece and Holy Family, on china, from the Imperial China Manufactory at Vienna. (Austria, No. 615.)

Mme. TURGAN, of Paris, for her painting on china. (France, No. 1504A.)

Mr. G. WALTHER, of Dresden, for his paintings on china. (Saxony, No. 177.)

Section E. 3.—On Glass.

The Jury made no award in this Section.

DIVISION F.—MATERIALS AND PROCESSES APPLICABLE TO THE FINE ARTS GENERALLY, INCLUDING FINE-ART PRINTING, PRINTING IN COLOUR, &c.

Section F. 1.—Encaustic Painting and Fresco.

The following Prize Medals were awarded in this Section :—

To M. J. DEVERS, of Paris, for a Holy Family in enamel paste, painted on lava. (France, No. 818.)

To M. J. N. VON FUCHS, of Munich, for his specimen of a stereo-chromic method of producing indestructible paintings on walls, exhibited by Mr. Muhr. (Bavaria, No. 91.)

Section F. 2.—Ornamental Printing, Chromo-Typography, Gold-illuminated Typography, Typography combined or uncombined with Embossing.

The following Prize Medal was awarded in this Section :—

To M. G. SILBERMANN, of Strasburg, for his chromo-typography. (France, No. 374.)

The Jury were of opinion that the following artist was deserving of Honourable Mention :—

Mr. J. HARRIS, of London, for his imitations of ancient typography. (No. 244.)

Section F. 3.—Lithography (Black), Chromo-Lithography, Gold-illuminated Lithography, Lithography combined or uncombined with Embossing.

The following Prize Medals were awarded in this Section :—

To MESSRS. DAY and SON, of London, for their specimens of tinted lithography and chromo-lithography. (Fine Arts Court, No. 80.)

To Messrs M. and N. HANHART, of London, for their chromo-lithography in graduated tints. (Fine Arts Court, No. 64.)

To Messrs HULLMANDEL and WALTON, of London, for their drawings on stone with the stump, and for their lithotints. (Fine Arts Court, No. 71.)

To the IMPERIAL PRINTING OFFICE OF VIENNA, for the "Paradisus Vindobonensis" in chromo-lithography. (Austria, No. 362.)

To Mr. OWEN JONES, of London, for his chromo-lithography. (Fine Arts Court, No. 54.)

To M. R. J. LEMERCIER, of Paris, for his lithography and chromo-lithography. (France, Nos. 587 and 558.)

To MM. WINCKELMANN and SONS, of Berlin, for their coloured lithography. (Prussia, No. 306.)

The Jury were of opinion that the following artists were deserving of Honourable Mention :—

The fac-similes of ancient MSS. and illuminations by Comte AUGUSTE DE BASTARD, of Paris, have been duly appreciated by the Jury. As it appears, however, that the most important parts of the several objects exhibited are finished by the hand, the Jury abstained from a more special inquiry into their merits. (France, No. 1717.)

Mr. G. BAXTER, of London, for his printing in colours. (No. 115.)

M. F. DREGER, of Moscow, for his chromo-lithography. (Russia, No. 362.)

Mr. T. UNDERWOOD, of Birmingham, for a new process of lithography. (Fine Arts Court, No. 77.)

Section F. 4.—Zincography, or other modes of Printing.

The following Prize Medal was awarded in this Section :—

To Mr. R. APPEL, of London, for his anastatic printing. (No. 274.)

The Jury were of opinion that the following artist was deserving of Honourable Mention :—

Mr. J. HANFSTAENGEL, of Munich, for his galvanography. (Bavaria, No. 85.)

To the processes applicable to the Fine Arts generally, belong those employed by the next three Exhibitors, whose claims the Jury of Class XXX. have acknowledged in the following manner :—

Prize Medals were awarded

To Mr. B. CHEVERTON, of London, for his process of reducing sculpture by machinery, as exemplified in the Theseus. (No. 194.)

To M. A. COLLAS, of Paris, for his process of reducing sculpture by machinery, as exemplified in the Gates of the Battisterio at Florence, and other works. (France, No. 1709.)

The Jury were of opinion that the following artist was deserving of Honourable Mention :—

Mr. B. E. DUPPA, of London, for specimens of a new process of executing fine-art designs on detached tiles; the design being burnt in on the separate pieces, and then put together. Exhibited by Messrs H. MINTON and Co. (Class XXVII., No. 51.)

DIVISION G.—MODELS.

Section G. 1.—In Architecture.

The Jury having been directed to include architectural models in the range of their inquiries, were naturally led to reflect upon, and then to feel it a most agreeable duty to acknowledge publicly, the merit of the Building in which they met. The originality of the construction, and the rapidity with which it has been carried to completion would, in comparatively recent times, have induced popular enthusiasm to ascribe to fairy agency the power of overcoming obstacles hitherto considered to be insurmountable by human ingenuity. The noble simplicity of the whole edifice, the striking grandeur of its proportions, the novel and ingenious application of the materials of which it is constructed, and the admirable adaptation of all its parts to their multifarious purposes, gave to the person who conceived it, as well as to those who with so much zeal and success carried out the constructor's design, a right to the highest award in the power of the Jury to recommend. The Jury had, therefore, the honour to propose that a Council Medal be awarded to Mr. JOSEPH PAXTON, and a similar Medal to Messrs. FOX and HENDERSON. And although the Jury had already rendered justice to the claims of Mr. OWEN JONES, by awarding him a Prize Medal for his chromo-lithography, they felt it to be their duty to record here their opinion of the advantages resulting to the Building from the simple and tasteful style of decoration which Mr. Owen Jones has so skilfully suggested and so successfully applied.

The following Prize Medals were awarded in this section :—

To Mr. J. C. BOESCHE, of Magdeburg, for his models of Magdeburg Cathedral and of the Nuremberg Fountain, executed in limewood. To this artist the Jury have also made a money award of 30*l.* sterling. (Prussia, No. 785.)

To Mr. JABEZ JAMES, of London, for his model in various materials, of the Britannia Suspension Bridge. (Class VII, No. 106. Prize Medal, Class VII.)

To Mr. S. SALTER, of London, for his model executed in card of St. Nicholas' Church, now being rebuilt at Hamburg. (Class VII, No. 221.)

The Jury were of opinion that the following artists were deserving of Honourable Mention :—

M. J. H. CASSEBOHM, of Oldenburg, for his model of Heidelberg Castle, carved in cork. (Oldenburg, No. 1.)

Mr. S. CUNDY, of London, for his restoration of the Monument of Philippa of Hainault, in English alabaster, from drawings by Mr. G. C. Scott. (Main Avenue West, No. 60. Prize Medal, Class XXVII.)

Mr. T. DUNHILL, of London, for his model in plaster, and other materials, of a Metropolitan Cattle Market, with abattoirs, &c. (Class VII, No. 90.)

M. J. LEEMAN, of Berne, for his model of the Nuremberg Fountain, carved in wood. (Switzerland, No. 258.)*

M. J. LEEMAN, of Zürich, for his model of the Cathedral of Strasburg, executed in card. (Switzerland, No. 257.* Prize Medal, Class VII.)

Mr. W. STUART, of Plymouth, for a model of the Plymouth Breakwater, executed in limestone. (Class VII, No. 28.)

* Since the Award Book was closed, it has been ascertained that the two entries No. 257 and 258 refer to the same person.

Section G. 2.—In Topography.

The following Prize Medal was awarded in this section :—

To Mr. JOHN GRANTHAM, Secretary of the Liverpool Local Committee, for a model of the Docks and commercial portion of the Town of Liverpool, in various materials. (Main Avenue West, No. 95.)

Section G. 3.—In Anatomy.

The Jury of Class XXX. abstained from examining models in Anatomy, as such objects were transferred to another Class. (Minute of May 26th, 1851.)

DESIGNS.

The various designs for decoration, tapestry, embroidery, mixed fabrics, &c., not having been submitted to the examination of any other Jury, the Jury of Class XXX. appointed a Committee of their own body, which, together with members of Juries of other Classes, were instructed by the Royal Commissioners to report on the articles thus overlooked. This mixed Committee having reported accordingly, the Jury of Class XXX. proceeded to award the following Prize Medals :—

To MM. BERRUS BROTHERS, of Paris, for their general ability in designs for shawls. The Jury wished, however, to guard themselves from being supposed to approve of the introduction of landscapes in such designs, as exhibited in frames Nos. 1 and 2. (France, No. 55.)

To M. J. CHEBEAUX, of Paris, for his cotton and calico prints apart from their taste. (France, No. 1146.)

To M. C. E. CLERGEY, of Paris, for his designs generally, and his exhibited works in ornament. (France, No. 799.)

To M. A. COUDER, of Paris, for his Shawl Designs, and for his skilful execution of his Designs generally, apart from their taste. (France, No. 1566.)

To the GOVERNMENT HEAD SCHOOL OF DESIGN, established in London. (Fine Arts Court, No. 10.)

The mixed Sub-Committee examined the Designs intended for Manufactures, exhibited by this School, directed by Messrs. J. R. Herbert, R. Redgrave, and H. J. Townsend; the female department being superintended by Mrs. M'Ian. The Sub-Committee reported that in these designs they had observed a purity of taste, a propriety and elateness of invention, and a well-understood adaptation of style for the several objects, which do great credit to the directors and to their scholars. The Sub-Committee, therefore (Mr. Redgrave, one of its members and a Juror of Class XXX., having withdrawn), felt it to be their duty to propose to this Jury that a Prize Medal should be awarded to the Institution. They moreover recommended that Honourable Mention should be made of three of the pupils, and that six other pupils, viz., S. ASHWORTH, FLORENCE COLLINS, J. S. CUTHBERT, A. TOWNS, J. KYD, and J. RAWLINGS, should be mentioned with much approbation. The Jury of Class XXX., after due inquiry and mature deliberation, approved unanimously of these suggestions, and adopted the whole of these recommendations. The names of the three pupils to whom an Honourable Mention has been awarded will be severally found in their proper place.

To M. E. LAROCHE, of Paris, for his Manufacture Designs. (France, No. 291.)

To LUKE LIMNER, (Mr. Leighton,) for a variety of Designs. (Class XVII., No. 24.)

To Mr. DIGBY WYATT, of London, for good taste generally in his Designs. (Fine Arts Court, No. 30.)

The Jury were, moreover, of opinion, that the following artists were deserving of Honourable Mention :—

Mr. W. ALDRIDGE, a pupil of the Government Head School of Design, for his Designs. (Fine Arts Court, No. 10.)

M. C. BRAUN, of Paris, for his Designs for Calico Prints. (France, No. 72.)

Mr. JOHN CARTER, of Crayford in Kent, for his Designs unapplied.

M. F. DIDIER, of Paris, for his Designs for Shawls. (France, No. 820.)

M. N. A. GALIMARD, of Paris, for his Designs for Painted Glass. (France, No. 228.)

M. — GRUENTHAL, of Berlin, for his Patterns for Berlin Wool. (Prussia, No. 166.)

Mr. J. K. HARVEY, of London, for his Designs for Carpets. (Class XIX., No. 197.)

Mr. B. HEALD (Class XIX., No. 269), of the Government School of Design, at Nottingham, for his Lace Designs. (Prize Medal, Class XIX.)

Mr. EDWIN IRELAND, a pupil of the Government Head School of Design, for his Designs. (Fine Arts Court, No. 10.)

Mr. J. H. MÈREAU, of Paris, for his Designs for Lace Manufacturers. (France, No. 631. Prize Medal, Class XIX.)

M. — MEYNIER, of Paris, for his Designs for Shawls. (France, No. 638.)

MM. NAZE and Co., of Paris, for their Designs for Cotton Prints. (France, No. 625.)

M. E. PICARD, of Rouen, for his Designs for Woollen, Cotton, and other Printing. (France, No. 347.)

Mr. C. P. SLOCOMBE, a pupil of the Government Head School of Design, for his Designs. (Fine Arts Court, No. 10.)

Mr. G. TRUEFIT, of London, for his Design of a wrought-iron canopied Tomb. (Fine Arts Court, No. 75.)

The Jury of Class XXX. having brought their labours to a conclusion, cannot refrain from expressing their hope that steps may be taken for rendering the Great Exhibition as useful after it has ceased to be, as it has proved gratifying and instructive in the course of its short existence. It is the wish to see these hopes realized, that impels the Jury, even at the risk of overstepping the strict limits of their functions, to submit, with great deference, their views on this point to the Royal Commissioners.

The foundation of a permanent industrial Museum in the heart of the metropolis of trade and industry, seems to the Jury the logical and practical consequence of this Exhibition. It is in the "Crystal Palace" that the great truth has been impressed upon us that art and taste are henceforth to be considered as elements of industry and trade of scarcely less importance than the most powerful machinery. It seems also natural that this Museum should in the first instance consist of the objects to which the several Juries have called public attention as happy

types and models for imitation. While such a Museum on the one hand would be a lasting depository of industry and of the arts, it would, on the other, serve as the best and easiest standard of comparison by which human ingenuity might mark its progress, on the opening, ten years hence, of a new Great Exhibition ;— it would serve alike as a guide and as a beacon.

Thus the Great Exhibition of 1851, which already stands out so prominently in the past, would bear fruitful and lasting consequences for the future, and would acquire an additional claim to a grateful record in the annals of mankind.

The Greeks, our masters in the nobler arts, did not trust to the historian and the poet alone for the record of their achievements, but committed to the greatest artists the task of immortalizing their military triumphs. The Great Exhibition deserves to be celebrated as the triumph of industry and invention over commercial routine and international jealousies. Whether the "Crystal Palace" shall be removed or not, posterity will look for some mark of gratitude to the illustrious Prince to whom the present generation owe the realization of a gigantic thought ; — a thought which may have floated in the minds of others, but which received consistency, and was brought to maturity by his energy and perseverance.

The Jury of Class XXX., therefore, hope that on the site of the Exhibition Building a statue will be erected to Prince Albert. On its base should be recorded the share which statesmen and others have borne in bringing such an undertaking to completion. The Fine Arts would thus be called upon to perpetuate the memory of the Great Exhibition, to the attractions of which they have so variously and so powerfully contributed.

A. PANIZZI, *Reporter.*

London, September 1851.

CLASS XXX.

SUPPLEMENTARY REPORT

THE Exhibition of the Works of all Nations in the Crystal Palace had for its primary and essential object the display of whatever could be characterized as a production of Industry. It comprehended every kind of unwrought material, no less than the most ingenious results of machinery or the most exquisite examples of handicraft. But this complete and absolute recognition of industry as the purpose of the Exhibition did not, in the view of the Royal Commissioners, preclude from admission the productions of the Fine Arts; Painting alone being excepted, because, being but little affected by material conditions, it seemed to rank as an independent art. It was not without reason that such a course was adopted, when we consider how greatly, on the one hand, Architecture and Sculpture depend in the execution of their details on mechanical dexterity, and, on the other, how intimately the Fine Arts are connected with many branches of manufacture. So closely, indeed, do their provinces border on those of certain other arts, that it is often difficult to decide in what rank or class objects should be distributed, in the production of which industry and taste have been jointly employed.

This is most strikingly apparent in the case of jewellery and other works in the precious metals, works in bronze, iron, zinc, porcelain, glass, terra cotta, and also in every description of furniture; but it is not less true of carpets, tapestries, and embroidered and coloured stuffs, in all which the taste and beauty of the design depend upon the manner in which the material has been treated and its special conditions observed.

In the great markets of the world the preference will invariably be at once given to those productions which combine, with other indispensable requisites, the recommendation of good taste in their design and treatment.

Among the many good results which we may venture to anticipate from this Exhibition, it may not be too much to hope for a fuller revival of that happy alliance between the Fine Arts and Industry which subsisted in the middle ages, when the artist was more of a craftsman—the craftsman more of an artist—than is the case at present.

Indeed, even in our own day, such a system of co-operation has been established with regard to one object, the technical application of materials; and of the signal results thus obtained, many striking examples may be cited from the Exhibition.

Among these may be mentioned the wonderful specimens of casting in bronze, iron, and zinc; an art which, as regards the two latter metals, has only been brought to perfection in a recent period.

To the present age are also due two most valuable and original inventions, by which works of sculpture may be reproduced, in the one case by means of Galvano-plastic deposit; in the other, by the mechanical processes of M. Collas, in France, and of Mr. Cheverton, in England. The cheapness with which the noblest works

of art can be multiplied by means of these inventions cannot but tend to the more general development of a feeling for the beautiful. Such then are some of the results of the connexion between Industry and the Fine Arts.

But it was not only on account of their intimate association with the interests of Industry that the Fine Arts had a claim to be admitted into the Exhibition; their presence there, as was anticipated by the enlightened views of the Royal Commissioners, conducted essentially to the impressiveness of the general spectacle. It was the variety and beauty of the works of art that lent to the scene its peculiar grace and charm.

In this Report the objects contributed by the several nations will be considered in succession, commencing with Great Britain.

In the survey of each nation, its productions will be noticed in the following order:—

A. SCULPTURE AND WORKS OF PLASTIC ART—

1. Sculpture on a large scale, and in various materials, whether marble, metal, or wood.
2. Sculpture and its varieties on a small scale, in metal, "biscuit," ivory, wood, precious stones, shells.

B. GRAPHIC REPRESENTATIONS ON PLANE SURFACES—

1. New processes of painting.
2. Enamels on porcelain or metal.
3. Painting on glass.
4. Mosaics.
5. Designs for woven and printed stuffs.
6. Various processes of printing, such as lithography, lithochromy, zincography.

C. ARCHITECTURAL DESIGNS—

1. The Exhibition Building.
2. Architectural and other models.

THE UNITED KINGDOM.

From the first introduction of the Fine Arts in this country to the present day, they have received little or no notice from the Government as such: their encouragement, like that of many other important objects, has been left to the public. The foundation of the Royal Academy itself is of comparatively recent date, and the institution is self-supported. The collection of sculpture and antiquities in the British Museum, and that of painting at the National Gallery, have been formed only within the last half century, and many of their most valuable treasures are donations or bequests of private individuals. Before the building of the New Houses of Parliament, the distinguished artists of this country had rarely been employed by the Government on works of a Monumental character, and such commissions were, from their nature, not the objects of private munificence. This is one principal cause why, in the English school of painting and sculpture, no true Monumental style has been as yet formed.

Again, it was only in the year 1836, that the Schools of Design were formed;

institutions by means of which the Fine Arts have exercised a most beneficial influence on the vast productive energy of Great Britain. Much improvement in every branch of industry has been accomplished by means of these schools, but it must be acknowledged that in many kinds of manufacture the English productions, both in regard to their form and colour, show far less taste than those of other nations.

Both the Government and the nation, however, are now becoming conscious of the great importance of art, not only in its Monumental character, but in its relation to Industry.

The vast range of comparison which the Exhibition has afforded, by the juxtaposition of the products of so many nations, has directed the English mind to more enlightened views; and, from the energy of the national character and institutions, these newly awakened ideas may ultimately prove of the greatest benefit in regard both to the Fine Arts and the Manufactures of the country.

A. SCULPTURE AND WORKS OF PLASTIC ART.

1. *Sculpture on a large scale.*

No other nation has exhibited so many works of this class as Great Britain. This may be partly accounted for by the fact, that the English sculptors have not been embarrassed, like those of other countries, by the cost of transporting their works from a distance; but the far greater wealth of the English, as compared with other nations, is another cause of this numerical superiority.

With regard to the quality of their sculpture, it must be confessed that the productions of the modern English school, till within a comparatively recent date, have not been such as to command the approbation of the most competent judges.

In the earlier periods of English art, the name of Flaxman stands alone; and, fertile as this great genius was in invention, the execution of his works hardly equals the beauty of their conception.

His influence seems to have been scarcely felt for a considerable period: the strong tendency to Realism* in the English school of sculpture found its natural expression in portraiture. Chantrey, long pre-eminent among his contemporaries, produced a great number of admirable busts; but in all the works of this period which have a higher pretension, and claim to rank as Ideal sculpture, there is a striking deficiency, not only in scientific knowledge, but in taste and in genuine Plastic style.†

* A work is called Realistic when the artist restricts himself to the task of rendering an individual model in all its parts, form, character, and the like, just as they appear before him. On the other hand a work of art is called Ideal when the artist modifies the figure in these same respects, according to his own feeling for its inner significance and outward beauty of form—attributes which necessarily vary in each case.

† When we say of a work of sculpture that it possesses "style," the following qualities ought to be implied. The sculptor must have so treated the solid material, such as stone, metal, wood, with which he has to deal, as not to remind the spectator of the nature of the substance employed, but so as rather to suggest to the eye the character of the object imitated, flesh, drapery, or whatever it may be.

Further, as we learn from the antique sculpture, in the treatment of naked surfaces, the muscles should not be represented by prominences so isolated and abrupt as to impair the general breadth, but should be rather indicated by moderate depressions in broad surfaces.

To this general criticism, F. H. Baily, in his best works, forms a distinguished exception. Among these, however, we can hardly reckon the three statues in the Exhibition, of a Hunter, a Young Girl, and Eve; of the latter a cast in zinc only was exhibited. But the merit of these works was not overlooked by the Jury, who have awarded them a Prize Medal. (Cat., p. 8, Nos. 6 and 7.)

Since the period referred to, a new race of sculptors has arisen in England, who possess in a remarkable degree the qualities in which their predecessors were deficient. Among the chief causes which have combined to produce this school may be reckoned the influence of the genius of Flaxman, the study of the noblest examples of Greek art preserved to us in the Elgin marbles, and the example of the great Thorwaldsen, with whom many of the English sculptors at Rome had constant intercourse.

Among the most distinguished of contemporary sculptors we may specially mention the name of Gibson. In his *Hunter and Dog*, a lively and imaginative conception is combined with an exquisite feeling for harmony of lines, and with thorough knowledge. The treatment is strictly Plastic; the details carefully and conscientiously wrought out. The unanimous award of the Jury would have bestowed the Council Medal on this work had not the artist been disqualified from receiving a prize by filling the office of a Juror in this Class.

Next should be mentioned the name of Mr. RICHARD J. WYATT, whose death, in the full maturity of his powers, we have to deplore.

His statue of *Glycera* represents a girlish figure, slight and full of simple grace; the characteristics of feminine beauty are indicated in the modelling with great delicacy; the drapery is treated with good taste, and with a due regard for style. One feeling pervades the whole design, and imparts to it a peculiar charm. This work, therefore, united all those qualities which entitled it to receive a Council Medal. (Cat., p. 11, No. 103, second improved edition.)

The following sculptors are well worthy to rank next to the distinguished names already noticed:—

J. H. FOLEY, of London. A *Youth at a Stream*: of this a cast in plaster, and another in bronze, were exhibited. The figure is about to plunge into a river;

In drapery, again, to attain the same general breadth of effect in the larger surfaces, which are supposed to be defined by the forms and action of the body, the details of the folds should be represented not by big, heavy projections, but by numerous contiguous channellings or markings.

The sculptor must, moreover, take care not to attempt, in every part of his work, as perfect an imitation as the nature of the solid material he employs would admit, but he should adopt a treatment more and more conventional in proportion as the object he has to represent is less and less important, flesh being the most important; for otherwise the degree of illusion sought for in the imitation of flesh cannot be attained, because the imitation of many subordinate objects can be carried much further in the solid material with which the artist has to work. In sculpture "in the round," it is also necessary that the centre of gravity be so observed as to suggest to the spectator the idea of solidity and security. In reliefs, lastly, this rule is to be followed,—that, whether the work be in high, middle, or low relief, no single portion should project beyond the extreme limit of general relief in each case intended, but that the whole profile of the relief should be restricted within a given scale; that, again, there should not be more than two distances in the composition, so that two figures at the most can stand one behind the other; to attempt greater depth is to invade the province of picturesque composition, and by destroying the idea of relief from an actual plane, to cause indistinctness of outline.

he still clings to the branch of a tree rising over his head, whilst he advances one foot somewhat timidly. The motive is remarkable for originality and grace, and the conception is well sustained by the whole treatment; in the slender proportions, and finely modelled well-turned limbs, the artist has admirably expressed the attributes of youthful beauty. Another of his works represents a group of Ino and the infant Bacchus, in plaster. Ino, reclining at her ease, holds up to the infant god a bunch of grapes, towards which he eagerly stretches his hands. There is a sprightly grace in the attitude of Ino, and much refinement of form; but on the whole this group is not so simple in conception as the Youth at the Stream; the Prize Medal has, therefore, been awarded to the two works conjointly. In his statue of Hampden (in plaster), executed for the new Houses of Parliament, the same artist has shown that he can unite the peculiarities of individual life, and the details of costume necessary in an historical portrait, with a true Plastic style. (Cat., p. 9, No. 47, p. 155, No. 19.)

J. BELL, of London. The Eagle-slayer, cast in bronze, and also in iron. This figure represents a powerful man in very strong action, at the moment after shooting an arrow into the air. The violence of the exertion has brought the muscles into full play. The artist has admirably succeeded in expressing the momentary and transient character of the action, and the form is modelled with a knowledge and truth of detail which are seldom found in the English school. His work has, therefore, obtained the Prize Medal. (Cat., p. 9, No. 53.)

In the statue of Falkland (in plaster), executed for the new Houses of Parliament, the same sculptor has displayed a mastery rarely attained in portraiture; the conception is very spirited, the treatment throughout strictly Plastic; the figure is remarkable for its noble presence, and its attitude of calm and dignified repose. (Cat., p. 9, No. 28.)

The following artists also exhibit, in their styles, the application of just principles of art:—

P. MACDOWELL, of London. The most remarkable work of this sculptor is his Eve (in plaster). This figure is modelled with great knowledge, the attitude is graceful, and the expression of longing curiosity well rendered. We may also mention his Girl at Prayer (in marble), a figure treated with simplicity and depth of feeling, and very carefully executed. His marble figure of Cupid has also considerable merit. Prize Medal. (Cat., p. 8, Nos. 22, 23, 24.)

W. CALDER MARSHALL. The Sabrina of this artist is remarkable for the feminine grace of the motive, the head has a fine character of individuality, and there is great beauty in the form and in the general expression: in marble. Prize Medal. (Cat., p. 155, No. 15.)

T. SHARP, of London. A Boy stretched on the ground, looking round in alarm, as if startled at a lizard. This is a remarkable work—quite unlike, in choice and treatment of subject, any which has been as yet noticed in this Report. The artist has not hesitated to express that dryness and meagreness of form which characterizes the particular stage of boyhood here selected for representation; but these details are rendered with the utmost accuracy, and with an admirable feeling for nature. The eye of the ordinary observer, habitually accustomed to the specious effect of mere smoothness of surface, may, in some degree, be repelled by this truthfulness of representation; but, like all other truth, it will not the less be

ultimately appreciated, and we may regard this figure as in itself a proof, how great an effort the English school of sculpture is making in the right direction. Prize Medal. (Cat., p. 155, No. 20.)

J. HOGAN, of Ireland. A drunken Satyr, gorged with new wine, which has distended all his veins and muscles, makes a last effort to save himself from falling. This work contains evidence of careful study, but the attitude has something violent and ungraceful: in plaster. Prize Medal. (Cat., p. 155, No. 14.)

B. JENNINGS, of London. In his marble figure of Cupid this artist has been very happy in the representation of youthful form. (Cat., p. 155, No. 81.)

The same may be said of the Arethusa of E. THURPP, of London, a recumbent figure leaning on one elbow, though there is rather a want of life and individuality in the features. A Boy catching a Butterfly, by the same artist, is a carefully executed and attractive work: in marble. (Cat., p. 155, Nos. 56 and 58.)

A Nymph bathing, by J. LAWLOR, of London, also deserves notice here: in marble. (Cat., p. 155, No. 22.) All the three last-mentioned works have obtained Prize Medals.

The portrait statue of Flaxman, by the late M. L. WATSON, of London, shows how greatly this artist excelled in Iconic Sculpture. The figure, which is executed out of a very beautiful block of marble, is seated; the general attitude is remarkably true to nature, the head full of intelligence, and the whole design is worked out with great spirit, and with conscientious labour. The colossal seated figures of Lord Eldon and Lord Stowell, by the same artist, are also remarkable specimens of the same class of sculpture, though not equal in merit to the statue of Flaxman. The hands appear too large: in marble. Prize Medal. (Cat., p. 155, No. 60, and p. 9, No. 81.)

L. MACDONALD, of Rome. The iconic figure by this sculptor, executed in the manner and costume of classical antiquity, shows that the artist has a just perception of style and sound knowledge: in marble. Prize Medal. (Cat., p. 295, No. 18.)

In conclusion may be noticed the following artists, as deserving the Honourable Mention bestowed on them by the Jury:—

W. BEHNES, of London, for his Nymph startled by a Lizard: in marble. (Cat., p. 155, No. 54.)

W. THEED, of London, for his marble group of the Prodigal Son embraced by his Father, and for his Narcissus, also in marble. (Cat., p. 155, Nos. 13 and 59.)

H. WEEKES, of London, for his Sleeping Child with a Dog: in marble. (Cat., p. 8, No. 21.)

E. B. STEPHENS, of London, for his Deer Stalker and Dog. (Cat., p. 8, No. 29.)

F. M. MILLER, of London, for Two Orphan Children at Prayer: marble. (Cat. p. 11, No. 98A, second improved edition.)

Mr. and Mrs. T. THORNYCROFT, of London, for the Royal Children, in the characters of the Four Seasons: in plaster. (Cat., p. 155, No. 34.)

G. MYERS, of London, for the Tomb of Bishop Walsh, in stone; a monument in which the ecclesiastical style of the middle ages is well sustained, not only in the principal figure, but also in the accessories. Prize Medal. (Class XXVII, Cat., p. 136, No. 533.)

To this list the name of HANCOCK deserves, in my opinion, to be added, for his

statue in plaster of the Beatrice of Dante, in her beatified state. The figure is distinguished by a pure and noble expression of the head, although many defects may be remarked in the drapery. (Cat., p. 8, No. 25.)

In concluding this notice of English sculpture, it is right to mention that several highly distinguished artists have not contributed any works to the Exhibition.

2. *Sculpture and Works of Plastic Art on a small Scale.*

To this branch of English art the remarks already made on sculpture on a large scale are generally applicable. Even at the present day many of the most distinguished artists who have executed and exhibited works of this class are foreigners.

1. *Works in Metal.*

(a.) Embossed (Repoussé) Work.

A. VECHTE, of France, at present settled in England. The works of this artist in strictness belong to Class XXIII. (jewellery and goldsmiths' work), but they are so essentially and exclusively productions of Fine Art, that it is impossible to pass them over without mention in this Report. They consist of a shield as yet unfinished, and a vase representing the contest between Jupiter and the Giants, executed in silver for the great establishment of Messrs. Hunt and Roskell at Birmingham. These works show that no living artist has so fully entered into the spirit of the Italian style of the sixteenth century, commonly called the *Cinque Cento*, as Vechte. He has also exhibited a shield, which, having been executed in France, is therefore in the French Department. In its design the artist has harmonized with great skill two celebrated compositions of the Murder of the Innocents, that by Raphael—preserved to us in the engraving by Marc Antonio, and in the tapestry of the Vatican,—and that known to us in the picture by Nicolas Poussin. Honourable Mention. (Cat., p. 124 No. 97.)

J. V. MOREL and Co., of Paris, now settled in London. This firm exhibit a set of cups, made of different kinds of precious stones, decorated with small figures, animals, masks, and other ornaments, exquisitely wrought in gold and silver, and in enamel, the whole executed in the feeling of Benvenuto Cellini, and with the same refined taste. In the expression of the heads only there appears a somewhat too modern sentiment. The talent displayed in these works is so remarkable, that though they belong strictly to Class XXIII, where they have been rewarded with a Council Medal, they cannot be passed in silence here. (Cat., p. 125, No. 117.)

(b.) Medals and Coins.

W. WYON, of London, Chief Engraver of the Mint.* This artist is certainly one of the most distinguished of his class in the present day. He is endowed with a just perception of nature, and a refined sense of beauty in form and movement. His works are executed in mezzo-relievo, in that style which alone is admissible in Numismatic Art, and which he has brought to great perfection. Both the Medals, and the enlarged models of Medals, which he has exhibited, fully bear out these remarks. But I would particularly call attention to his models of the heads of

* This notice was written a few days before the death of the distinguished artist to whom it relates.

Her Majesty and His Royal Highness the Prince Albert, for the obverse of the Prize Medal of the Exhibition. His office of Juror alone disqualified him from receiving a prize. (Cat., p. 153, No. 284.)

L. C. WYON, of London. This young artist is a worthy inheritor of his father's talent. His portraits of the children of Her Majesty and that of His Royal Highness Prince Albert, as well as his model for the reverse of the Prize Medal, are executed in a very good style, and the whole is wrought out with the earnestness of a labour of love, as well as with great simplicity and feeling for nature. Prize Medal. (Cat., p. 153, No. 286.)

2. *Works in Ivory.*

R. C. LUCAS, of the Firs, Winchester. This artist has executed with great fidelity copies of several of the most celebrated antique works in the British Museum, such as the bronzes of Siris, the supposed head of Proserpino on the medallions of Syracuse, and the admirable carving in hone-stone by Albert Durer, representing the Birth of Saint John the Baptist, also in the British Museum. Honourable Mention. (Cat., p. 153, No. 306.)

3. *Works in "Biscuit."*

MINTON and Co. The productions of this great porcelain manufactory properly belong to Class XXV., and have there been rewarded with a Council Medal; but so many of them deserve to rank as examples of Fine Art, that I think it right to mention them here. I would particularly notice the copies of the celebrated silver cups in the Museo Borbonico at Naples, with groups of centaurs in relief, the copy of the Farnese Flora, and also two friezes. The establishment deserves the greatest praise for these productions, by means of which the finest models of Art are circulated, and a correct taste more widely diffused. (Cat., p. 123, No. 1.)

The same laudable endeavour to spread the knowledge of Art is apparent in the manufactures of COPELAND, CHARLES MEIGH and SON, and JOSIAH WEDGWOOD and SONS. The manufactory of BELL and Co., at Glasgow, deserves especial notice, on account of the judgment generally displayed in their choice of forms from the antique. The more sparing use of gold as an ornament distinguishes these works from those of most other English manufactories.

4. *Carvings in Wood.*

Wood carving was from a very early period much esteemed by the English, and has been diligently cultivated among them. An extraordinary number of specimens, not only in the Gothic and Renaissance styles, but in the "Rococo taste" of the last century, have been contributed to the Exhibition, and many of them are of the greatest merit. Though the greatest part of these specimens are articles of furniture, and therefore belong to Class XXVI., yet among them are two of such high artistic merit, that I cannot omit a passing notice of them here. These are—(1.) A large sideboard, exhibited by COOKE and SONS, of Warwick. (2.) A bookcase in the style of the Renaissance, by HOLLAND and SONS, of London.

Among the wood carvings which may be considered purely as works of Fine Art are—(1.) Those of T. W. WALLIS, of Louth, in Lincolnshire. This artist has represented various kinds of dead game with a true feeling for nature, and with

an extraordinary mastery in every kind of detail. He is also entitled to the greatest praise for his carving of a mass of vine-leaves, which is executed with the most minute and scrupulous imitation of nature, without losing the characteristics of a true Plastic style. Prize Medal. (Cat., p. 149, No. 89.)

W. G. ROGERS, of London. A cradle executed in box-wood for Her Majesty Queen Victoria, and richly ornamented with carved reliefs; also, a group of musical instruments, among which may be especially noticed a violin. These works show an extraordinary dexterity in the treatment of the material, and the ornaments of the cradle are in excellent taste. Prize Medal. (Cat., p. 154, No. 353.)

In concluding this notice of works of sculpture of the United Kingdom, I must mention the machine invented by Mr. B. CHEVERTON, of London, for the reproduction, either on the same or on a smaller scale, of works of sculpture. The figure commonly known as the Theseus, in the Elgin collection of the British Museum, has been reduced by this process in alabaster, for the purpose of casting in plaster, with an accuracy which leaves the most fastidious critic nothing to desire.

The benefit which all lovers of Art, and more particularly artists themselves, will derive from this discovery, are so obvious, that I need not further insist on them here. Prize Medal. (Cat., p. 151, No. 194.)

B. GRAPHIC REPRESENTATIONS ON PLANE SURFACES.

1. *New processes of Painting.*

B. E. DUPPA, of London, the inventor of a new mode of monochrome painting on tiles. The painting has all the appearance of a chalk drawing, and is so united with the tile by the action of fire, as to bear any amount of exposure to the weather. Among the specimens exhibited of this process is a head which appears exactly like a drawing in red chalk. Honourable Mention. (Class XXVII., No. 51.)

2. *Enamels on Porcelain or Metal.*

W. ESSEX, of London, exhibits a number of copies of celebrated pictures, such as the so-called "Gervartius" of Vandyke; Joseph and Mary with our Saviour, by Murillo—both in the National Gallery; and a Young Girl, after Sir Joshua Reynolds. In all these copies the drawing, colouring, and general character of the originals are rendered with the utmost fidelity. Other specimens, however, such as the Portrait of Shakspeare, and that of Her Majesty Queen Victoria, are somewhat hard, patchy, and deficient in modelling. These enamels are on metal. Prize Medal. (Cat., p. 152, No. 241.)

S. CHESTER, of London. The picture by Murillo in the National Gallery, mentioned in the preceding notice, has been admirably copied by this artist on porcelain. Every trait in the original is rendered with the utmost delicacy; this work reflects the highest credit on its author. Honourable Mention. (Cat., p. 152, No. 246.)

Lastly, the following artists may be noticed as fully deserving the Honourable Mention they have obtained: ECKELMANN and WÜSTIAH, for the portraits of the Queen, the Prince of Wales, and of H.R.H. Prince Albert, on a jewel-case belonging to Her Majesty Queen Victoria; HASLEM, for his St. John, after Murillo, and

also for his "Ecce Homo," after Correggio, both which pictures are in the National Gallery; BELL, BONE, and lastly, BRADLEY, of Stoke-upon-Trent, for a duck enamelled on china, and exhibited by Copeland. (Cat., p. 5, No. 140, second improved edition, p. 152, No. 237, p. 152, No. 249, p. 152, No. 238, p. 128, No. 2.)

3. *Painting on Glass.*

In this branch of painting there are two very distinct styles. The one has been principally employed for the decoration of church windows, and being thus intimately associated with architecture, must rigidly conform to its laws. Thus, in this style the general character of the ornament should be Architectonic, the patterns should be very distinct, combining beauty of form with harmony of colouring; there should be great repose in the attitudes of the figures, and the draperies should be in simple masses. The other style of glass-painting attempts to give all the effect of an actual picture, strictly so called, and to heighten this effect by the gorgeousness and transparency of the colour. The former of these kinds of glass-painting is to be regarded as of higher importance, and has more claims to rank as an original art than the latter, which, however, is capable of being made very attractive. But it is of the greatest importance not to mix the two styles. This has been done in many windows executed in the 15th and 16th centuries, in which the artist, abandoning the architectonic laws which ought to be his guide, has attempted those higher artistic effects, which are only to be achieved in other materials, such as oil or fresco, and has consequently fallen very far short of his aim.

Very good works in both kinds of glass-painting were to be seen in the Exhibition, but these must by no means be taken as the best specimens which the art of our age is capable of producing. It is much to be regretted that the Exhibition did not contain any examples either of the ecclesiastical glass-paintings of the Royal Manufactory at Munich, or of the imitation of pictures by Messrs. Boissérée of Bonn; in both of which establishments works have been executed which have hardly been surpassed in the present age. It is right to add that the latter manufactory has judiciously availed itself of artists trained in the establishment at Munich.

It is of the greatest importance in the imitation of ancient glass, which is now so generally attempted, that the characteristics of different periods should be faithfully rendered. The number of churches now built in the Gothic style makes this discrimination of styles all the more necessary. But the study of ancient examples may lead to the perversion of taste, if the artist persist in adhering to the conventional forms of the mediæval styles, and choose to ignore the superior knowledge of drawing of his own day. If, however, the laws above stated be observed, they will be found perfectly compatible with natural forms.

(a.) *Ecclesiastical Style.**

J. HARDMAN and Co., of Birmingham. In the window-glass exhibited by this establishment in the Mediæval Court, the true principles of the style have been

* This style of glass-painting might be termed Architectonic, as it is applicable not only to churches, but to many other edifices, civil as well as religious.

faithfully observed; and the execution of the work is very careful. It may be noticed, however, as a defect in these windows, that the glass of the backgrounds between the figures is too transparent; they are consequently inferior in repose and harmony of colouring to the mediæval windows of the best time. Prize Medal. (Cat., p. 136, No. 532.)

CHANCE BROTHERS and Co., of Birmingham. Two Gothic windows, also executed according to correct principles. Honourable Mention. (Cat., p. 127, No. 60.)

The three following artists also deserve the Honourable Mention which they have received: HOLLAND and SON, of Warwick, for their "Life of Christ." (Cat., p. 127, No. 63, second improved edition.) I. G. HOWE, of London, for his imitation of an ancient painted window. (Cat., p. 127, No. 67, second improved edition.) W. WAILES, for the decorative part of his design. The figures are not equal in merit to the rest of the work. (Cat., p. 127, No. 73.)

(b.) Pictorial Style.

M. and A. O'CONNOR, of London. In his "Raising of Lazarus," this artist has been very successful in giving the characteristics of an oil painting; everything is in perfect keeping, and is drawn with great truth and care. In the richness of the colouring, he has turned his material to very good account. Honourable Mention. (Cat., p. 127, No. 65, second improved edition.)

4. *Works in Niello.*

In this kind of art, which received the name of "Niello" work in the middle ages, figures or ornaments are first engraved on a silver plate, and the incised lines are then filled up with a paste compounded of silver, copper, lead, sulphur, and borax. The dark colours so inlaid, contrasting with the bright surface of the silver, produce an effect not unlike that of a print from a copper plate.

This art, which had been for a long time neglected, was revived in the present day with great success by Wagner, a silversmith from Berlin, established at Paris. In the Exhibition was a gauntlet, on which a design by Maclise was engraved in niello, by S. H. and D. Gass, of London. The work is very skilfully executed. Honourable Mention. (Cat., p. 124, No. 83.)

5. *Designs for Printed and Woven Fabrics, for Embroidery, and for Book-covers.*

The primary law of all such designs is, that they must not disturb the flatness of the surface on which they are drawn, but only diversify it with lines agreeable to the eye, and with harmonious masses of colour. Hence no foreshortenings should be attempted in such designs, and all perspective views are to be absolutely rejected, as at variance with the principles of a true style of ornament. It is obvious that the character of the pattern will be essentially affected by the quality of the materials and the purpose for which it is intended. Thus, for instance, shawls, though of a yielding texture, rather follow the movements of the body in a general sense; hence the patterns of shawls should be of considerable size, with soft, flowing outlines. Cottons, on the contrary, and other similar clothing fabrics which cling more to the body, require smaller and more symmetrical patterns.

Mr. DIGBY WYATT, of London, exhibits a considerable number of designs for

various purposes. They are in very good taste, and in perfect accordance with the principles here laid down. Prize Medal. (Cat., p. 148, No. 30.)

JOHN LEIGHTON, jun., of London. The designs for book-covers exhibited under this name have very remarkable merit, from the variety of forms in the patterns, and the happy choice of the colours. Prize Medal. (Cat., p. 91, No. 24.)

C. J. RICHARDSON. Out of the multitude of designs exhibited by this artist, some show a good taste. (Prize Medal awarded, Class XXVI.)

The following names have also been Honourably Mentioned: JOHN CARTER, No. 10, of Crayford in Kent; J. K. HARVEY (Class XIX., No. 197), for the design of a carpet with a rich pattern; and BENJ. HEALD, for his design for lace. (Prize Medal, Class XIX.)

THE GOVERNMENT HEAD SCHOOL OF DESIGN IN LONDON. The designs for textile fabrics contributed by the pupils, both male and female, of this establishment, were executed in such good taste, and with such correct knowledge of principles, that a Prize Medal was awarded to the Institution, and the names of several of the pupils were mentioned with approbation. These names will be found in the Report of Mr. Panizzi.

This seems to be the most fitting place to notice the patterns of the Oriental stuffs which India, Turkey, and Tunis contributed to the Exhibition in such rich variety.

In the fabrics of India the correct principle already laid down, namely, that patterns and colours should diversify plane surfaces without destroying or disturbing the impression of flatness, is as carefully observed as it was in the middle ages, when the decoration of walls, pavements, and carpets was brought to such perfection by the Arabs. But it is not only the observance of this principle which distinguishes the Indian stuffs in the Exhibition; they are remarkable for the rich invention shown in the patterns, in which the beauty, distinctness, and variety of the forms, and the harmonious blending of severe colours, called forth the admiration of all true judges of art.

What a lesson such designs afford to manufacturers, even in those nations of Europe which have made the greatest progress in industry!

In these remarks I have specially referred to the productions of India. Some of the fabrics exhibited by Turkey and Tunis display analogous qualities, but in the greater part of these we trace in the patterns an European influence, which has overlaid or partly superseded the true characteristics of the national style of ornament.

6. *Architectural Designs.*

G. TRUEFIT, of London. A design for a Gothic tomb and canopy, to be executed in iron; the proportions, in this design, are very good, the style very correct, and the treatment suitable to the material. Honourable Mention. (Cat., p. 149, No. 75.)

7. *Various processes of Printing, such as Lithography, Lithochromy, Zincography.*

The art of printing in colours has been brought to such perfection by the employment of several successive plates for the same impression, as in many cases to produce an effect quite equal to that of a painting.

(a.) Lithochromy.

DAY and SON, of London. The specimens exhibited by this establishment are admirable for keeping, force, and finish. Prize Medal. (Cat., p. 149, No. 80.)

M. and N. HANHART, of London. In the plates executed by these artists, there is a clearness, force, and harmony of colouring, combined in a degree which is very rarely attained. Prize Medal. (Cat., p. 149, No. 64.)

HULLMANDEL and WALTON, of London. In the works of these artists we find similar excellences in a very high degree. The specimens are executed partly with the stump, partly with lithographic chalk and the stump combined, and finally by printing in colours. Prize Medal. (Cat., p. 149, No. 71.)

OWEN JONES, of London. In the establishment of this artist flower and fruit pieces are executed with great force and truth, and in his patterns he shows excellent taste. In his imitations of miniatures he has been less happy, though these works display considerable merit. Prize Medal. (Cat., p. 149, No. 54.)

T. UNDERWOOD, of Birmingham. In the novel attempt to represent water-colour drawing by printing in colours, this artist has been most fortunate; the specimens exhibited by him are well worthy of Honourable Mention. (Cat., p. 149, No. 77.)

(b.) Printing in Oil-colours.

G. BAXTER, of London. The view of the exterior of the Exhibition Building, and a female portrait by this artist, show very great skill in a process which so seldom yields a successful result. Honourable Mention. (Cat., p. 150, No. 115.)

(c.) Zincography.

R. APPEL. This artist is the inventor of a process, by which he transfers to a zinc plate ancient or modern engravings, and woodcut impressions, as well as drawings executed either with the pen or the pencil. A peculiar kind of ink is employed for the transfer; and not only is a perfect facsimile of the original thus obtained, but copies, to any extent, of this facsimile are again produced, at an exceedingly moderate price, and all of equal excellence. A woodcut by Albert Durer, taken from his "Life of the Virgin," the zinc matrix to which this was transferred, and the impression from this plate, which were all exhibited, afford sufficient evidence of the value of the invention. Many years ago Messrs. DUPONT and Co., of Paris, obtained similar results by their process of transferring designs to stone; for this they have received a Prize Medal, in Class XVII. (Printing) The advantages of such mechanical means of multiplying rare and costly prints are too obvious to need remark. Every kind of drawing can be executed in Mr. Appel's prepared ink; his invention has therefore this great advantage, that it enables artists at once to fix and reproduce their sketches, instead of having recourse to lithography, woodcutting, or engraving on metal. The most rapid and evanescent expression of an artist's thought may thus be arrested, without impairing the spirit of the original sketch in the process of transfer. Prize Medal. (Cat., p. 153, No. 274.)

(d.) Facsimiles of Printing executed by the hand.

J. HARRIS, of London. The masterly imitation of old printing, by this artist, has received Honourable Mention. (Cat., p. 152, No. 244.)

C. ARCHITECTURAL DESIGNS.

1. *The Exhibition Building.*

In this most admirable edifice, every kind of excellence appears to be combined, whether we consider the wonderful adaptation of the whole building to its purpose, the surprising skill shown in the employment of glass and iron, which have never before been used as building materials on so vast a scale, the happy adjustment of the proportions, the calculation of which, from the complexity and extent of the whole plan, must have been exceedingly difficult, the simplicity of the mode of construction, or lastly, the judgment shown in the choice and disposition of the colours with which the Building is ornamented. The whole work reflects the greatest honour on all who had a share in it. The utmost praise is due to Mr. PAXTON for the design of the Building; to Messrs. FOX, HENDERSON, and Co., the Contractors, for the masterly manner in which it has been executed; and to Mr. OWEN JONES for the painting.* (Council Medals awarded to the two former by Class VII.)

2. *Models.*

The practical utility of architectural models, and the instruction and pleasure that may be derived from them, have never been more sensibly felt than at the present day. This branch of art was therefore very properly represented in the Exhibition.

JOHN GRANTHAM (Secretary to the Liverpool Local Committee). A Model of the town of Liverpool. This work is executed with great accuracy, the proportions are said to be very well preserved, and the details finished with great care. Prize Medal. (Cat., p. 10, No. 95.)

JANEZ JAMES, of London. A Model of the Britannia Tubular Bridge. Very valuable as showing the construction of this celebrated work. Prize Medal. (Cat., p. 10, No. 106. Prize Medal awarded also by Class VII.)

S. SALTER, of London. A Model of the Church of St. Nicholas, of Hamburg, executed after the designs of Mr. Scott. Also a Model of a Church at Wilton. These two models are entitled to the greatest praise, on account of the accuracy of the proportions, and the masterly manner in which all the details are expressed. Prize Medal for first. (Cat., p. 47, No. 221.)

N. J. COTTINGHAM, of London. A Model of a spandrel in an arch—Hereford Cathedral. The manner in which the character of Gothic architecture is pro-

* It has been remarked by several distinguished authorities that, when iron is painted, the nature of the material should be indicated by the colours employed. This is no doubt true as a general principle, yet in this instance a deviation from it seems allowable. The combination of white, blue, and red harmonizes most happily with the slender tent-like structure, and light, cheerful, appearance of the whole building, and contributes to produce that wondrous and fairy-like effect which has so impressed the minds of all who visited the Exhibition. A darker tone would have been inadmissible, as it would have given a gloomy appearance to the whole.

served in this model shows great knowledge on the part of its designer. Honourable Mention. (Cat., p. 9, No. 63.)

S. CUNDY, of London. A restoration of the tomb of Queen Philippa, Queen of Edward III., executed in alabaster, with very rich Gothic ornaments. Honourable Mention. (Cat., p. 9, No. 60. Prize Medal awarded by Class XXVII.)

T. DUNHILL, of London. Model of a Metropolitan Cattle-market, with abattoirs, and other appurtenances, executed in plaster and other materials, and very skilfully planned. Honourable Mention. (Cat., p. 44, No. 90.)

W. STUART, of Plymouth. Model of the Plymouth Breakwater in limestone. Honourable Mention. (Cat., p. 10, No. 28.)

In concluding this notice, I must also mention the Mediæval Court, fitted up by Professor A. W. PUGIN, one of the most distinguished among English architects as a designer of Gothic buildings and ornament. In this Court he has endeavoured, with great success, to present to the spectator a general idea of the ecclesiastical art of the middle ages, by exhibiting an assemblage of altars, shrines, tapestries, painted windows, chalices, and patens, vestments, and other ecclesiastical furniture and objects. Most of these articles are executed from his own drawings. The merit of the collection has been duly acknowledged by the Jury.

THE ZOLLVEREIN.

I. PRUSSIA.

Since the year 1815 great efforts have been made in Prussia, by the successive monarchs and administrations of Prussia, to encourage the Fine Arts in that country. Museums, and other buildings of a similar character, have been erected; sculptors, and more recently painters, have been employed in the execution of Monumental works; and the cultivation of all those manufactures on which Art can exercise any influence has been greatly promoted by the foundation of the "Institution for Trades," (*Gewerbe-Institut*), under the energetic and judicious management of Privy Councillor Beuth. That these efforts have led to the happiest results has been proved by the Exhibition, which has furnished to Prussia a long-desired opportunity of showing what progress has been made.

A. SCULPTURE AND WORKS OF PLASTIC ART.

1. *Sculpture on a large Scale.*

Until the commencement of the present century, the Berlin sculptors continued to imitate the false and mannered style of the contemporary French school. The first who returned to the principles of nature, and to a careful expression of details, was the sculptor Schadow.

But the Berlin school owes its present excellence to the auspicious co-operation of three great men, who devoted themselves to its improvement. These were, the late architect Schinkel, the late sculptor Frederick Tieck, and Christian Rauch, a sculptor whose active energies still remain unimpaired, notwithstanding his great age. These three artists had profoundly studied the masterpieces of ancient art; the contemplation of these had imbued their minds with an intense feeling for beauty, and revealed to them the great laws of style. Inspired by these models,

they did not attempt to reproduce them by a servile and spiritless imitation, but rather to apply the principles therein developed to works fitted for the wants of modern times, combining this reverence for antiquity with an earnest study of nature, and a most diligent and scientific carefulness of execution. It is to be regretted that Rauch himself contributed none of his works, if we except one or two copies from his *Victories*; and that many of his distinguished scholars, such as A. Fischer, Gustav Blaaser, Wredow, and Schievelbein were also absent.

But though the school of Berlin was thus only partially represented in the Exhibition, yet many of the works it contributed gave ample proof, how great have been the results of the combined influences which have aided in the development of German art.

A. KISS, of Berlin. An Amazon on Horseback attacked by a Tiger. With a ferocious bound the animal has leaped upon her horse, and fastened on him with teeth and claws. The Amazon is about to transfix her assailant with her spear. This work, which is on a colossal scale, has been cast in zinc by Geiss from the original model, and bronzed by electro-deposit. In this group, the artist has, by an original and powerful effort of invention, placed before our eyes the most critical moment of the action. The whole expression and character of the Amazon are very nobly conceived; the anatomy displays consummate knowledge; great style is shown in the general treatment of the surface, and the details are wrought out with wonderful force and truth. The whole work is full of soul; it seems the full, earnest utterance of a true artistic nature.

The great qualities of this work called forth, at the time of its completion, the most unbounded admiration on the part both of artists and friends of art. It was executed in bronze by a public subscription, and now ornaments one side of the staircase of the Royal Museum at Berlin.

The approbation which it has received proves that, where a work of art possesses striking merits, even considerable faults cannot counteract the favourable impression which is produced. It is one of the fundamental laws of sculpture "in the round" that from many, but, at all events, from the principal points of view the outlines of the figures shall be distinct, and at the same time beautiful; and this rule is signally transgressed in the work of Kiss. The forms of the tiger and the horse are blended together in one confused mass, so that the front view is very unsightly, and even in the side views we lose on one side the head of the horse, on the other that of the tiger. Council Medal. (Cat., p. 11, No. 279.)

F. DRAKE, of Berlin. The pedestal of a statue of King Frederick William III. of Prussia, erected by the inhabitants of Berlin as a token of their gratitude for the embellishments which this monarch has bestowed on their Thiergarten (Zoological Gardens). The work exhibited is in plaster, half the size of the original pedestal. In the reliefs with which it is ornamented the sculptor selected subjects which contain allusions to the local destination of his work. Thus he has represented a number of figures, of every age and sex, enjoying themselves in the open air. We see groups of children looking into a bird's nest or feeding the swans, young maidens weaving garlands, old people leading children to the scene of the sports, or contemplating their youthful gambols with an air of calm enjoyment. There is much beautiful feeling in the treatment of this subject: the heads are full of expression, the movements of the figures very spirited, and the

different groups are skilfully connected. The composition is executed in a very good style of alto-relievo, the details finished with the greatest care.

On the whole, this work is deserving of the very great and general admiration that has been bestowed upon it. It may however be noted as a defect, that the artist has not throughout preserved the relative proportions of the figures. Prize Medal. (Cat., p. 11, No. 273.)

ALBERT WOLFF, of Berlin. A statue in marble of a young maiden holding a lamb in her arms. This figure is entitled by the sculptor "Innocence," and its purity and simplicity of character fully express such an idea. The drapery is throughout treated in a Plastic style, and the execution is very careful. Prize Medal. (Cat., p. 260, No. 307.)

T. KALIDE, of Berlin. A Group. A Boy, lightly grasping a swan and looking upward, holds up his left arm as if to guard himself. This group is designed for a fountain, the water being meant to issue from the beak of the swan.

The figure of the boy is very prettily conceived, and the action very spirited. The whole work is executed with care, and in a good style. Duplicates of this group were exhibited; one in bronze, the property of His Majesty the King of Prussia, the other cast in zinc by Geiss. Honourable Mention. (Cat., p. 259, No. 285. Prize Medal awarded, Class XXII.)

C. MÖLLER, of Berlin. Several bronze casts of animals from models by this artist were exhibited: a Newfoundland Dog, cast by Friebe, of Berlin; a smaller Dog of the same kind with a Boy, and a Bulldog with a Girl, by H. Fischer. These works are distinguished by great life and truth. They are very carefully executed, and in a good style. Honourable Mention. (Cat., p. 259, No. 292.)

LUDWIG WICHMANN, a pupil of Gottfried Schadow. A Young Maiden in the act of filling her pitcher with water. Cast in bronze, and tooled from the model of the original, in the foundry of Count Einsiedel, at Lauchhammer, in Saxony. This figure is distinguished by beauty of proportions, good anatomy, and careful execution. The Jury were, however, precluded from noticing it, because it was not exhibited in the artist's name, but in that of the foundry where it was cast.

2. *Sculpture on a small Scale.*

(a.) In Metal.

The Shield of Faith. This work was a present from His Majesty the King of Prussia to His Royal Highness the Prince of Wales. Though it belongs properly to Class XXIII., and has received a Council Medal from the Jury of that class, it is so exquisitely wrought, and the design is of so high an order of art, that I feel myself compelled to offer a few remarks on it here. In the execution of this work the talents of several most distinguished artists have been most felicitously combined. The architectural portion of the design is due to the Privy Councillor and Director of Architecture, Stüler. All the groups of figures are modelled from drawings by Cornelius, whose rich and fertile genius has here expressed in truly artistic language the cardinal idea of the Christian Faith, and happily combined with this principal motive an allusion to the immediate purpose for which the shield was executed.

The designs were modelled in low relief by the sculptor, A. Fischer, in a most

masterly manner, and with a true perception of the principles of Plastic Art. The reliefs were then moulded, and the casts from them finally chased and tooled with consummate skill by the engraver, A. Mertens.

The figures of the Twelve Apostles, which are from the designs of Cornelius, were beautifully cut in onyx by the distinguished gem-engraver, Calandrelli, who has long resided in Berlin; the fine enamels and ornamental work are executed by Klossauer, jeweller to the Prussian Court. The Council Medal awarded to this shield is presented to His Royal Highness the PRINCE OF WALES, as its exhibitor. (Cat., p. 6.)

J. WAGNER and SONS, jewellers to the Court of Berlin. An ornamental piece of plate to serve as a fruit-dish, in silver embossed work. This, like the preceding work, belongs in strictness to Class XXIII., in which it has received the Council Medal. I cannot, however, pass over in silence a work which shows to what perfection this class of art has been brought by the silversmiths of Berlin. In the whole design there is great beauty of form, and much invention is displayed in the subjects with which it is decorated. These represent the successive stages in the development of civilization.

The first scene represents the simple characteristics of that primeval age which is still engrossed in supplying the mere physical necessities of life, when hunting, fishing, and tending of flocks and herds, are the only occupations of man. This forms the pedestal of the vase: round the columns a more advanced civilization is represented by figures, with the symbols of tillage, horticulture, and the vintage. In the reliefs upon the body of the vase, which are still unfinished, we have the characteristics of a still higher stage of social refinement: mining, commerce, navigation, and the arts and sciences generally, are here represented figuratively.

As the apex of the whole composition, we have the Genius of Light overcoming a snake, designed to symbolize the highest form of civilization, when man has arrived at the government of those worst enemies, his own passions. Both the detached figures and the groups in relief which develop this train of ideas are disposed with admirable judgment about the vase; they are also executed with great knowledge, and a masterly finish of detail.

In the fruit, flowers, and foliage, which form the subordinate ornaments, the combination of a close imitation of nature with a very good style deserves the greatest praise. It may, however, be noticed as a defect, that the mass of the figure of the Genius is somewhat too large, and that his wings appear ill set on, as if not originally united to his body. It is to be regretted that another Berlin artist, equally distinguished for his embossed work, M. Netto, contributed nothing to the Exhibition.

JULIUS FRANZ. Two Victories modelled by this artist, from the figures by Rauch, on a reduced scale, of about two feet in height, cast in bronze, and tooled by Fischer. These works are remarkable for the scrupulous accuracy of their execution.

J. BERNHARD AFINGER. Four medallion portraits cast in bronze by this artist deserve praise for the truth of the general conception; but the execution, though always careful, is occasionally somewhat feeble, and the treatment too picturesque. Honourable Mention. (Cat., p. 260, No. 309.)

(b.) Medals.

K. FISCHER, Medalist, of Berlin, exhibits nine medals. In the designs of these, both obverse and reverse, good taste and feeling for nature are combined with correctness of style in the treatment of low relief, and a very careful and conscientious method of execution.

The medal struck in honour of Alexander von Humboldt, as the author of *Cosmos*, is specially worthy of mention. Prize Medal. (Cat., p. 259, No. 281.)

C. PFEUFFER, Chief Medalist to the Court of Berlin, exhibits 22 medals. These show a very careful execution, but the overcharged character of the forms, which are sometimes too full and heavy, is at variance with the true laws of this branch of art. Honourable Mention. (Cat., p. 259, No. 286.)

The works exhibited by the ROYAL IRON FOUNDRY OF BERLIN fall under Class XXII., and have there been rewarded with a Council Medal; they belong, however, so completely to the province of Art that they deserve some notice here. The admirable taste shown in the ornaments of these works, and the good style of the sculptures, prove the extensive and abiding influence of the immortal Schinkel in this establishment. Among the works which specially deserve notice are, a large vase inlaid with silver and ornamented with a design by Hesse, chief architect of the Palace, after Thorwaldsen's *Triumph of Alexander*, and two stands ornamented in a similar style with small groups.

B. GRAPHIC REPRESENTATIONS ON PLANE SURFACES.*Designs for Tapestry.*

This kind of work has been more extensively practised and brought to a greater perfection in Berlin than in any other place. Among the different designs of this class, those of M. Grünthal deserve special notice for their general good taste. Honourable Mention. (Cat., p. 256, No. 166.)

Lithochromy.

WINCKELMANN and SONS, Berlin. The specimens of Lithochromy exhibited by these artists are among the most perfect that have been produced. By the employment of a number of stones for the same impression, a great variety of tints has been obtained, so that the most complicated objects, and particularly architectural ornaments, can be represented with all that refinement of gradation which they present in a perspective view. The most remarkable specimens are the views of the Castle of Orianda, designed by Schinkel for the Emperor of Russia, and several of the Plates in a magnificent work on Architectural Decoration, by M. Lewis Gruner, of London. Considering the excellence of these lithochromes, their price is proportionately moderate, which is an additional merit. Prize Medal. (Cat., p. 260, No. 306.)

C. ARCHITECTURE.*Models.*

J. C. BOESCHE, of Magdeburg. A model of the Cathedral at Magdeburg, of considerable dimensions; also a model of the beautiful fountain at Nuremberg.

These works are accurate in their general proportions, and the details are faithfully and carefully worked out. A model for another fountain is very neatly executed, and the design is pretty and original. Prize Medal. (Cat., p. 271, No. 785.)

To this artist the Jury have also made a money award of 30*l.* sterling.

II. BAVARIA.

A. SCULPTURE AND WORKS OF PLASTIC ART.

1. *Sculpture on a large Scale.*

The Munich school of sculpture owes its importance to SCHWANTHALER, whose untimely death in the flower of his years we have to deplore. The number of highly imaginative designs which the fertile invention of this artist has drawn from ancient mythology, from the middle ages, and modern times, has justly earned for him a lasting fame. At the Exhibition he was represented only by a small number of his works. Though in the statues of Queen Libusa and of King George Podiebrad of Bohemia, cast by Miller of Munich from Schwanthaler's models, the imaginative conception and noble proportions of the figures are well worthy of this great artist, they afford but a very imperfect idea of the whole range and compass of his genius. As they were not exhibited in the name of the artist, they could not enter into competition for a prize.

It is to be regretted that the distinguished sculptor WIELMAN contributed nothing to the Exhibition.

JOHN HALBIG, of Munich. A Colossal Lion, cast in one piece by Miller; part of a group representing Victory in a Chariot drawn by Four Lions, and designed to be placed on the triumphal arch at Munich. The motive of this work is good, but the form is too heavy and clumsy. This overcharged appearance may perhaps be partly explained by supposing it to be calculated for the height at which the figure is to be placed.

J. LEEB, of Munich. A Young Girl looking at a Nest full of young Cupids, which she holds in her hands. This figure shows *naïveté* in its conception, and is carefully executed in marble. Honourable Mention. (Cat., p. 274, No. 89.)

2. *Sculpture on a small Scale.*

M. HAGEN, of Munich. A large Ivory Cup, on which are sculptured figures of children playing, in the style of Flamingo; in a very good style, and executed with great care. Honourable Mention. (Cat., p. 274, No. 83.)

B. GRAPHIC REPRESENTATIONS ON PLANE SURFACES.

1. *New Processes of Painting.*

J. N. VON FUCHS, Professor in Munich, has invented a new mode of wall-painting, called *stereochromy*, which has many advantages over the fresco method which has been so generally adopted for walls. By the new process, the surface can be retouched to any extent, as in the case of an oil-painting, while it possesses far greater durability, being protected by a varnish from the effect of exposure to the weather. A figure painted by M. Muhr, a pupil of Kaulbach, exhibited as a

sample of this process, affords good proof of its merit. Prize Medal. (Cat., p. 274, No. 91.)

2. *Enamels on Porcelain and on Metal.*

OTTO WUSTLICH, of the Fine Arts Establishment of Schmidt, of Bamberg. A miniature of Charles IX. firing upon the Huguenots, on the night of the Massacre of St. Bartholomew, after a picture by Baron Wappers, of Brussels. This miniature is remarkable for its truth, its force and transparency of colouring, the goodness of its general tone, and its careful execution. Prize Medal. (Cat., p. 274, No. 92.)

3. *Painting on Glass.*

STEPHEN KELLNER, of Nuremberg. A reduced copy of the celebrated painting by Volkamer, in the Church of St. Laurence at Nuremberg. In this work, which is executed with the greatest care, the colours and every detail of the original picture are faithfully rendered. Prize Medal. (Cat., p. 274, No. 86.)

4. *Various Processes of Printing.*

FRANZ VON KOHELL, Professor at Munich, exhibits a new mode of multiplying Indian Ink and other drawings, by means of copper-plates deposited by galvanic action: the invention is hence called galvanography. The process is as follows:—The drawing having been first executed either with encaustic colours or with lithographic chalk, a plate of copper is precipitated upon it by galvanic action. By the contact of the particles of metal with the colours or chalk drawing, the plate receives, during its formation, an actual impression of the delineated surfaces, the lines being indented on the copper as if by the ordinary process of the burin. The plate, thus engraved by galvanic agency, becomes a matrix capable of yielding other impressions.

F. HANFSTÄNGEL, of the Lithographic Establishment of Munich, has exhibited two plates as samples of this process; the matrix or plate impressed by galvanography, and the patrix, or impression, taken again from this plate. An impression in paper, showing the result, is added. These specimens are remarkable for the force, clearness, and evenness of the print. Honourable Mention. (Cat., p. 274, No. 85.)

III. KINGDOM OF SAXONY.

A. SCULPTURE AND WORKS OF PLASTIC ART.

Sculpture on a large Scale.

ERNST RIETSCHEL, of Dresden. This distinguished artist, one of the ablest pupils of Rauch, exhibits three works, the varied character of which shows the versatility of his talents. 1. A group of the Virgin weeping over the body of our Saviour, cast in plaster, from a model executed for His Majesty the King of Prussia. In the figure of our Saviour, anatomical truth is combined with nobleness of form; the countenance has a fine dignified character; its mild transfigured expression proclaims the triumph over the agonies of death. In the Mary, the countenance and the clasped hands reveal the deepest but most resigned sorrow of soul. The drapery of this figure is admirably composed. The execution is

fully worthy of the invention shown in this group. 2. The Angel of Christ, a very noble relief in marble. The angel is represented in the form of a graceful youth, floating in the air, with the infant Saviour in his arms; two infant angels attend his course. This group has a peculiar charm from the beauty of the heads and figures, the grace of the action, the suddenness of the movement impressed on the flying drapery, and the masterly yet tender handling of the marble. 3. Love riding on a Panther, whose course he tries to arrest, eagerly grasping his neck with both his hands. This beautiful conception is quite in the spirit of ancient art, and is expressed with great vigour of hand. Prize Medal. (Cat, p. 279, No. 185.)

B. GRAPHIC REPRESENTATIONS ON PLANE SURFACES.

Enamels on Porcelain.

HEINRICH BUCHER, of Dresden. This artist exhibits a rich collection of miniatures on enamel, of which I will only notice here the copy of the celebrated "Christ with the Tribute-money" of Titian, in the Dresden Gallery, in which the character and deep transparent colouring of the original are admirably rendered. The works of this artist are also remarkable for their very moderate price. Prize Medal. (Cat, p. 279, No. 176.)

GUSTAV WALTHER. The six enamels, after well-known pictures in the Dresden Gallery, exhibited by this artist, are creditable works in this class of art. Honourable Mention. (Cat, p. 279, No. 177.)

IV. DUCHY OF SAXE-GOTHA.

F. E. HENNEBERG and Co. A view of the Wetterhorn, in Switzerland, painted on china. This work has considerable merit. Honourable Mention. (Cat, p. 272, No. 772.)

V. WURTEMBERG.

A. SCULPTURE AND WORKS OF PLASTIC ART.

Sculpture on a large Scale.

L. VON HOFER, sculptor, of Stuttgart. Casts in plaster from two Arabian thorough-bred horses, in the stud of the King of Wurtemberg. They are represented rearing; each is held down by a naked attendant. The original groups are executed in marble, and are placed in the garden of the palace at Wurtemberg. Good judges of horses are of opinion that in these works of Hofer the characteristics of a particular breed of horses are very accurately given. (Cat, p. 281, No. 105.)

T. WAGNER, of Stuttgart. The Penitent Magdalen, a figure in marble. This work is characterised by truth of expression and careful execution, but the drapery is drawn over the ridge of the leg so as to intercept its outline, in a manner not consistent with the laws of Plastic Art. Honourable Mention. (Cat, p. 281, No. 108.)

VI. ELECTORATE OF HESSE CASSEL.

C. M. WEISHAUPF SONS, jewellers, of Hanau. A chess-board in gold and silver. The sides of the board are richly ornamented with festoons of flowers, small animals, birds, &c., in admirable taste, and executed in enamel with the utmost

delicacy and minuteness. The pieces are finished with the same extraordinary richness and refinement of ornament. The kings are portraits of the two great antagonist monarchs of the early part of the sixteenth century, the Emperor Charles V. and Francis I. of France; the queens represent Margaret of Parma, the daughter of the Emperor, and Margaret of Valois, the sister of Francis. The work properly belongs to Class XXIII., and has been rewarded there with a Council Medal; but from its great merit as a work of art, I have felt it my duty to notice it here. (Cat., p. 262, No. 412.)

VII. GRAND DUCHY OF HESSE DARMSTADT.

C. W. HEYL, ivory-carver in Darmstadt. A large goblet, on which is carved in relief the battle of Arminius, after a design by Lindenschmidt. This work is entitled to great credit, from the extraordinary finish of the execution. The introduction, however, of several planes in the relief, and the violent foreshortenings, give to the whole composition a picturesque character at variance with the principles of Plastic Art, whilst in some of the foreshortenings, particularly that of a horse, there is a positive want of drawing. Honourable Mention. (Cat., p. 274, No. 75.)

VIII. OLDENBURG.

Architectural Models.

J. H. CASSEBOHM, of Oldenburg. A model of the Castle of Oldenburg, correct in its general proportions, and carefully finished, though in the details of the architecture the character of the several members is not accurately rendered. Honourable Mention. (Cat., p. 291, No. 1.)

FRANCE.

The French have been distinguished for many generations by the great encouragement they have bestowed, as a nation, on the Fine Arts. The French Government, under every change in its outward form, has not failed to regard Art as one of the most important instruments of civilization; and recognising its great and beneficial influence on the manufactures of the country, has, by the most liberal grants, placed it in a peculiar manner under the protection of the State. Millions of the national revenue have, in consequence, been devoted to the erection of great public edifices, and to the purchase of the best works of native artists. Establishments like that of the Gobelins Tapestry, and the Sèvres China Manufactory, or the Ecole des Arts et des Métiers, have been not only founded but maintained by the State at an immense cost. In consequence of this encouragement on the part of the Government, the French school of Art has been most fertile in its productions; many branches of art have been brought to a rare degree of perfection, and the diffusion of an improved taste has exercised a most beneficial influence on a variety of trades and handicrafts. By these means Paris has become an universal market, not only for the Fine Arts themselves, but for most of the branches of industry to which they are in any way allied.

A. SCULPTURE AND WORKS OF PLASTIC ART.

1. *Sculpture on a large Scale.*

During the first years of the French Revolution, commencing with 1789 onwards, a reaction against the style of art previously esteemed was brought about by the painter David. This movement was followed up by the sculptors Chaudet and Bosio, who devoted themselves to a diligent but cold imitation of the masterpieces of ancient Roman sculpture.

At a later period the style of many sculptors was affected by the passing but dangerous influence of Canova. After this a very strong Realistic tendency prevailed, and at a later period still the influence of the best Greek Art has been felt in the French as in other modern schools. This tendency on the one hand to revert to the pure Greek models, and the Realistic tendency on the other hand, are the two chief movements which characterize the modern French school. Both styles, and the Realistic especially, were represented in the Exhibition by a number of remarkable works; but it is to be regretted that many distinguished sculptors, such as Rude, Duret, Jaley, Simard, Dumon, Ramay, the Comte Nieuwerkerke, the Baron de Triqueti, and David of Angers, did not contribute any work.

J. PRADIER, Member of the Institute; *Phryne*. In this youthful female figure the beauty of feature, the subtle refinement of form, and the sprightly grace of the attitude, alike correspond with the name of the celebrated *Hetaïra* which M. Pradier has given to his work. The careful chiselling of the surface, and the general breadth of the treatment, show that the sculptor has not studied the masterpieces of Greek Art in vain. On the other hand, for so young and beautiful a form, there is rather too large a development of the body; the drapery in front falls too perpendicularly, so as to cut the figure in two, and its monotonous parallel lines want movement; whilst behind, the mass of folds assumes the unsightly form of a triangle. The idea of ornamenting the hem of the garment with a red "Meander" border is not happy, for, in contrast with the colourless uniformity of the rest of the marble, such an ornament appears crude and misplaced.

This artist also exhibits a group, cast in bronze, of a crouching Venus conversing with a Cupid, who leans against her. There is great originality in the conception of this group, and the artist has been for the most part very happy in the selection and treatment of the forms. The execution, however, is not equally careful throughout. Council Medal for the *Phryne*. (Cat., p. 245, No. 1407.)

AUGUSTE DEBAY, of Paris. "*Le Premier Berceau*." This name is given by the sculptor to a figure of Eve, seated, with her hands clasped over one knee, and supporting in her lap her sleeping infants, Cain and Abel. In the form and attitude of Eve there is great beauty, truth, and refinement of feeling, and the countenance admirably expresses the tenderness of a mother. The treatment of the figure, however, is rather too picturesque in character; the general motive is somewhat strained and violent; the forms of the children are not happily composed; and there is great want of style in the hair of Eve, which is gathered together behind in a somewhat clumsy mass. Prize Medal. (Cat., p. 221, No. 45.)

E. L. LEQUESNE, of Paris. A *Satyr*, cast in bronze, represented after the manner of the ancients, dancing on a wine-skin, in a state of joyous drunkenness. In this figure the character of the head, and of the strong, hard muscles, quite corresponds

with the general Satyr type created by the imagination of the ancient artist. The motion is easy and natural, and the carefulness of the execution is maintained throughout. Prize Medal. (Cat., p. 11.)

A. EREX. Of the three groups exhibited by this artist the most agreeable is that in marble of Hero and Leander, standing mournfully beside each other.

Cain and his Family. The characteristics of a base, abandoned nature are admirably expressed in the countenance and coarse clumsy limbs of Cain, which are very carefully studied from the life ; in plaster.

The allegorical group (in plaster) of the City of Paris imploring heaven to take away the plague of Cholera, is a less agreeable work, on account of the manner in which the subject is treated. The City is represented as a seated female figure, with an old man and a youth expiring of the pestilence, one on each side. In these figures the moment of death is expressed with wonderful truth. This work is a specimen of that class of art which, seeking to act on the feelings through the representation of mere physical suffering, may be called the Revolting, a style which appears to be little cultivated or admired except in France.

These works all show great knowledge on the part of the sculptor. Prize Medal. (Cat., p. 242, No. 1215, p. 11.)

J. CLESINGER, of Besançon. A Bacchante, who is rolling on the ground in a state of drunken excitement. This figure is remarkable for the masterly chiselling of the marble, the great knowledge of anatomy, and the beauty of the countenance ; but these excellences do not sufficiently excuse the sculptor for having in this work allowed his imagination to be perverted and degraded to the service of a low sensuality. Moreover, the treatment of the hair is at variance with the principles of a good style, and there is a great want of taste in the arrangement of the folds of the drapery. The Jury considered this subject to be of an objectionable character, but have made Honourable Mention of the excellences pointed out above. (Cat., p. 228, No. 419.)

J. M. RAMUS. Cephalus, tenderly supporting in his arms the dying Procris. This group is, in its leading lines, very happily composed, and shows in the forms much knowledge of nature ; but the modelling is not in a sufficiently large style, and is not sustained throughout. Prize Medal. (Cat., p. 245, No. 1419.)

M. PASCAL, of Paris. A group, in marble, of a monk holding out a crucifix, which a little boy is eagerly kissing ; a little girl stands by, steadfastly gazing at him. There is a charming feeling for nature in the expression of the heads ; but the general composition, and particularly the drapery, may be termed rather Picturesque than Plastic in style, and, with the exception of the nude forms, the whole is only sketched out in the marble. Honourable Mention. (Cat., p. 250, No. 1660.)

C. CORDIER, of Paris. The head of a negro, cast in bronze, by this artist, is a true example of characteristic portraiture ; the conception is full of life, the execution most masterly, and well sustained throughout. Honourable Mention. (Cat., p. 229, No. 460.)

JEAN DEBAY, of Paris. A group of a young hunter, rushing forward to despatch a stag pulled down by a hound. The hunter is naked, and the whole type is conceived in the spirit of ancient art. This group, from the natural manner of the action, forms a very pleasing composition. The hunter and the animals are

modelled with great knowledge, and a good style is shown in the execution. Prize Medal. (Main Avenue East.)

FRATIN, of Paris. This artist, the most celebrated sculptor of animals in France at the present day, contributes to the Exhibition two eagles with a wild goat, which they have slain, a greyhound, another hound, life size, and several animals on a smaller scale, all in bronze. These works are fully worthy of the artist's reputation. The general conception is most spirited, the details of nature are most faithfully rendered, and the treatment throughout, particularly of the plumage and the skins, is most careful, and in a very good style. Prize Medal. (Cat., p. 242, No. 1235.)

A. LECHESNE, of Paris. Two groups, in plaster, of dogs and children. In one is represented a dog rescuing a child from the attack of a snake; in the other, which forms the sequel to the preceding, the snake lying dead, the dog exhausted, and the child full of joy and gratitude for its rescue. These works are very remarkable, from the extraordinary truth and spirit in the modelling and expression of the dog's head. The form of the child, on the contrary, is too swollen and coarse; and in the representation of the shaggy coat of the dog, the execution is too minute, and not in a legitimate style.

In another group, a woman is lying on the ground asleep, or dead. Above her hovers an eagle, about to carry off her child. Here, again, the treatment of the bird is very masterly, and by far the best part of the work. Prize Medal. (Cat., p. 11, No. 573, second improved edition.)

BONNASSIEUX, of Paris. A group, in bronze, representing Cupid, as a youthful figure, clipping the tips of his own wings; standing beside him is a dog. The form of the Cupid is very graceful, but the head is too directly copied from the antique type. The execution is very unequal; the dog, in particular, is very carelessly modelled. Honourable Mention. (Cat., p. 222, No. 64.)

A. G. FOURDINOIS. A large sideboard, ornamented with figures and dogs, on a large scale, carved in wood. In these the artist has shown such a happy invention, and such power of execution, that this work must be considered to rank as sculpture, and cannot be passed without a notice here, although it belongs to Class XXVI., and has been rewarded in that Class with a Council Medal.

It may not here be out of place, after this notice of the works of English, French, and German artists, to compare briefly the intellectual tendencies which these three great nations severally manifest in their schools of sculpture.

In each of these schools, though in the case of England only within the present generation, Greek sculpture has been acknowledged as the standard by which all creations of ideal art must be judged.

The English school has, on the one hand, sought to attain the qualities of grace and loveliness of form; more recently this school has also aimed at strength and manliness of character, chiefly in strong action. The French have principally turned their attention to the representation of sensual beauty, to the tender feelings called forth by the relations between the sexes, to other forms of the Sentimental, or to the style which may be designated as the Revolting.

Finally, German art has been especially devoted to the representation of deep religious feeling, or of calm, idyllic scenes; it has also endeavoured to treat the most stirring moments of real life in a grand and impressive manner.

Of the works contributed to the Exhibition by these three nations, those most distinguished in the foregoing notices may be fairly cited in proof of the success with which each school has followed out its peculiar bent.

Sculpture on a small Scale.

(a.) In Metal.

Among the French works in silver analogous in style with the productions of Vechte mentioned before, is a service of plate in the taste of the sixteenth century, executed by FEUCHER, and exhibited by FROMENT MEURICE. This work is the property of the Duc de Laynes. A Prize Medal has been awarded to it in Class XXIII.

The French department of the Exhibition displayed an extraordinary abundance of small groups of human figures and animals, and other small bronzes.

Many of these are from the designs of distinguished artists, among whom may be noticed PASCAL, who contributes a charming group of three children with bunches of grapes, designed for a dinner service, Fratin, and also Méné, who works in the same style as Fratin.

In other bronzes we find copies from the works of celebrated sculptors, such as Rude, Duvet, and Pradier; these are often very well executed. A Daphnis and Chloe, after Gaylard, deserves special notice. But a great number of these specimens do not rise above the level of very pretty ornaments, executed without much style, and a notice of them here would occupy too much space. As the French medallists sent no specimen of their works to the Exhibition, no mention has been made of them in this Report, though the skill of many of these artists is very generally acknowledged.

(b.) Sculpture in Ivory.

L. LAUTZ, of Paris. A great cup, ornamented with reliefs, representing a battle scene. The composition of these is too picturesque, and not treated in accordance with the principles of Plastic Art; but it must be admitted that this is a work of extraordinary merit in the drawing and execution. Honourable Mention. (Cat, p. 226, No. 295.)

(c.) Sculpture in Wood.

M. J. LIGNARD, of Paris. A Boar-hunt, carved on a clock-case. Although this work is treated in a manner utterly at variance with the principles of Plastic Art, it is nevertheless a perfect masterpiece for truth of imitation, drawing, and execution. This artist has received from the Jury of Class XXVI. the Council Medal, especially for a richly ornamented clockcase, but his merits have been also acknowledged in Class XXX. by the award of a Prize Medal. (Cat, p. 244, No. 1326.)

The process invented by Mr. A. COLLAS, for reducing sculpture by machinery, which has been already referred to in the opening of this Report, must be noticed here. Prize Medal. (Cat, p. 251, No. 1709.)

B. GRAPHIC REPRESENTATIONS ON PLANE SURFACES.

1. *New Processes of Painting.*

It is now some years since a process of painting on lava has been perfected at Paris, chiefly by the exertions of the celebrated architect Hittorf. This kind of painting is as durable as that on porcelain, and is burnt in in the same manner. A copy of Raphael's picture in the Louvre, called *La Belle Jardinière*, executed by J. DEVERS, was contributed to the Exhibition as a specimen of this process. It is very carefully and faithfully copied, but the flesh is rather heavy and deficient in transparency. Prize Medal. (Cat., p. 235, No. 818.)

2. *Enamels on Porcelain and on Metal.*

Nowhere in Europe has the art of painting in enamel been carried to such perfection as in the celebrated manufactory of Sèvres. The works of this establishment are distinguished not only by the extent of the enamelled surfaces, but also by the perfection with which facsimiles of celebrated pictures are executed, the drawing and colouring of the original being preserved with marvellous truth. The Jury has therefore awarded a Prize Medal to M. DIETERLE (1369), as the Director of an establishment where such great results have been attained. Although it is to be regretted that the celebrated Constantine contributed no specimens of his works, the Exhibition contained a great number of paintings of the greatest merit.

MADAME A. DUCLUZEAU, of Paris. This most distinguished artist, whose recent decease I regret here to announce, contributed masterly copies of the following pictures in the Louvre:—*a.* *La Vierge au Linge*, by Raphael; *b.* The portrait of Vandyke, by his own hand; *c.* A portrait of a male personage, recently ascertained to be a masterpiece of Johann von Calcar; *d.* The portrait of Her Majesty Queen Victoria, after Winterhalter, (Cat., p. 245, No. 1369, and p. 10, No. 96.)

JACOBBER, of Paris. A Flower-piece, after Jan Van Huysum, by this artist, is a perfect masterpiece. Another flower-piece, after Von Spandonck, has also great merit. Prize Medal. (Cat., p. 225, No. 271.)

A. BÉRANGER, of Paris. The copy of a Portrait by Rubens, in the Louvre, and one of His Royal Highness Prince Albert, after a portrait by Winterhalter. Prize Medal. (Cat., p. 245, No. 1369, and p. 10, No. 97.)

MADAME P. LAURENT, of Paris. Three remarkable enamels on copper—two of which were after Raphael, the other, a Venus—were exhibited by this skilful artist. Prize Medal. (Cat., p. 245, No. 1369.)

MADAME JACOTOT, of Paris. This celebrated artist, now far advanced in years, contributed a copy of the portrait of Raphael, after the picture in the Portrait Gallery at Florence. The original is rendered with great truth. Prize Medal. (Cat., p. 245, No. 1369.)

BONNET, of Paris. St. John, enamelled on iron, of great merit. Prize Medal. (Cat., p. 245, No. 1369.)

SCHILT, of Paris. Paintings on two porcelain vases, and on a table, very masterly in execution. Prize Medal. (Cat., p. 245, No. 1369.)

MME. TURGAN. A Holy Family, after Raphael, of remarkable merit. Honourable Mention. (Cat., p. 247, No. 1504A.)

MARIETTE DE CHASSAGNE. A copy of the celebrated picture, by Horace Vernet, the meeting of Michael Angelo and Raphael, exhibited by Boyer, of Paris. (Cat., p. 248, No. 1554.) In this work every detail of the original is faithfully rendered. Honourable Mention.

HAMON. A casket of metal, with figures, *en grisaille*. In this work there is a successful revival of the process for which the Limoges school of enamel was so distinguished in the sixteenth century. Prize Medal. (Cat., p. 245, No. 1369.)

3. *Painting on Glass.*

(a.) Ecclesiastical Style.

ALFRED GERENTÉ, of Paris. A window in the style of the twelfth century. In the figures, which represent the history of Samson, and particularly in the ornaments, the style of the period is rendered with extraordinary mastery and truth. Prize Medal. (Cat., p. 224, No. 231.)

A. LUSSON, of Paris. In some windows in the taste of the thirteenth, fifteenth, and sixteenth centuries, the artist has given the style of each period with great knowledge and care. Honourable Mention. (Cat., p. 230, No. 565.)

(b.) Pictorial Style.

MARECHAL and GUYNON, of Metz. The sick of the plague receiving the Eucharist. The characteristics of a picture—keeping, truth of drawing, and expression—are very successfully rendered, and the advantages of a material admitting of such force and transparency of colours as glass are turned to the best account. These excellences are also exhibited in a high degree in a male portrait. Prize Medal. (Cat., No. 329.)

4. *Inlaid Works in Metal.*

J. ROUCOU. Different kinds of arms, such as pistols, inlaid with gold and silver ornaments, in very refined taste, and executed with rare mastery of hand. Prize Medal. (Cat., No. 1689.)

5. *Designs.*

(a.) For Woven and Printed Fabrics.

E. LAROCHE. A volume containing many designs for shawls, barèges, and muslins. The patterns show great taste and adaptation to the materials, and are admirably executed. Prize Medal. (Cat., No. 291.)

BERRUS BROTHERS. This establishment is one of the largest manufactories in France, and the designs for shawls which it exhibits have most remarkable merit both in regard to the patterns and the colours. The introduction of small landscapes, however, in some of these designs, is an infringement on the principle which has been already stated in this Report, that the pattern must not disturb the idea of flatness in the surface. Prize Medal. (Cat., No. 55.)

A. COUDER. Designs for shawls and other stuffs. The execution of all these is very masterly, and those for shawls are in a very good taste. The others are very deficient in this quality. Prize Medal. (Cat., No. 1566.)

J. CHEBEAUX. Some of the designs for cotton and calico by this artist show a very happy invention, and are executed with very great skill. In his designs for

other materials the execution is equally skilful, though there is a want of taste. Prize Medal. (Cat., No. 1146.)

The following artists deserve notice both for the taste and execution of their designs :—

F. DIDIER (820) and MEYNIER (638), both of Paris, in their designs for shawls ; NAZE and Co. (625), and BRAUN (72), in their designs for cottons ; E. PICARD (347), in his designs for calicoes ; J. H. MÉRAUX (631), in his designs for lace. All these have obtained Honourable Mention, and the last a Prize Medal. (Class XIX.)

(b.) For Painted Windows.

N. A. GALMARD, of Paris. In these designs the artist has been very successful in representing figures according to nature, and under the conditions of the Architectonic style. Honourable Mention. (Cat., No. 228.)

6. *The Government Manufactory of Gobelines and Beauvais Tapestry.*

This celebrated establishment, which has produced such a number of copies of celebrated pictures, contributed two specimens of tapestry to the Exhibition. One of these is a copy of Raphael's fresco in the Farnesina, in which Psyche is represented carried through the air by genii, and carrying the vessel which, at the behest of Venus, she has brought from the nether world. The other piece of tapestry is a copy of the celebrated picture by Horace Vernet, representing Ali Pasha looking on at the massacre of the Mamelukes, who, at his command, were shot by his soldiers. In both these copies not only is the general effect of the original picture faithfully rendered, but the intention and feeling of the artist are preserved in a degree which could hardly be expected, when we remember that the process by which these copies are executed is a purely mechanical one. (Council Medal, jointly with Class XIX.)

7. *Different kinds of Printing, such as Lithography and Lithochromy.*

R. J. LEMERCIER, of Paris. This artist exhibits a number of lithographs, which, from their force, depth of shadow, and fine gradation of tints and general tone, must rank among the most remarkable specimens of this art which have yet been produced. Prize Medal. (Cat., p. 230, No. 558.)

Lithochromy.

ENGELMANN. This celebrated establishment has well sustained its reputation by the series of admirably-executed specimens of lithochromy which it exhibits.

Printing in Colours from Wood Blocks.

G. SILBERMANN, of Strassburg, is the inventor of this mode of printing, and the coloured impressions from wood blocks exhibited by this artist are in every way remarkable. Prize Medal. (Cat., p. 227, No. 374.)

Although the facsimiles of the illuminations and initial letters of ancient MSS., exhibited by the Count AUGUSTE DE BASTARD, are worthy of the greatest admiration, on account of the extraordinary truth and skill with which they are executed, yet these works ought hardly to have been admitted into the Exhibition, as most of them were finished by hand. (Cat., p. 251, No. 1717.)

Here ought not to be omitted the name of Mr. C. E. CLERGET, of Paris, for his designs generally, and his exhibited works in ornament. Prize Medal. (Cat., p. 235, No. 799.)

AUSTRIA.

A. SCULPTURE AND WORKS OF PLASTIC ART.

1. *Sculpture on a large Scale.*

The only parts of the Austrian dominions from which large works of sculpture have been contributed are the Italian provinces, and especially Milan. In these works may be remarked a strong tendency to Realism.

G. STRAZZA, of Milan. Ishmael. This name is given by the artist to the figure of a boy lying on the earth, expiring of thirst. The dry and meagre forms, characteristic of this period of boyhood, are rendered with a truth which borders on the repulsive. The execution is masterly. The head, which is evidently studied from some type quite foreign to the subject of this work, conveys an expression of exhaustion which is almost painful. In the representation of this subject by painters, an angel bringing help to Ishmael is always introduced, and from the absence of this figure the general impression produced by the work of M. Strazza is most painful, and unrelieved by any mitigating circumstance. Prize Medal. (Cat., p. 205, No. 713.)

R. MONTI, of Milan. Eve after the Fall, arrived at the full consciousness of her crime. This figure, which is in marble, is appropriately conceived; the motive is pleasing, and the execution is very careful. It has consequently obtained from the Jury a Prize Medal. (Cat., p. 206, No. 746.)

This figure was not so generally admired by the public as another work by the same artist, representing a girl kneeling, with a thin veil thrown over her face; but the preference was not rightly given. Though extraordinary skill is shown in the execution of this veiled figure, true judges of art must always esteem it a mere specimen of dexterous workmanship; and they cannot but think, that in thus deviating from the undisguised representation of the human features, the artist has renounced the only means by which beauty, character, and expression, can be distinctly rendered in the countenance.

A. GALLI, of Milan. A youthful female figure, to which the sculptor has given the name of Susanna. The forms are pleasing and the movement pretty, and the work is very carefully executed in marble. But without the addition of the two Elders it would be impossible to recognise the subject. Prize Medal. (Cat., p. 205, No. 711.)

A. SANGIORGIO, of Milan. A colossal bust, in marble, of the poet Vincenzo Monti. The conception of this work is very spirited, and the execution most masterly and careful. Honourable Mention. (Cat., p. 205, No. 722.)

L. FRACCAROLI, of Verona. David in the act of slinging the stone at Goliath. The motive of this figure is very spirited, but a little strained; the features have a noble expression. The youthful character of the head does not accord with the rest of the body, in which the muscles are too strongly marked. This artist also exhibits a statue of Achilles wounded in the heel. Prize Medal. (Cat., p. 205, No. 710.)

L. MARCHESI, of Milan. Eurydice. In this figure, which is of marble, there is

something very pleasing in the general expression, but the execution of the details leaves much to be desired. Honourable Mention. (Cat., p. 205, No. 716.)

B. GRAPHIC DELINEATIONS ON PLANE SURFACES.

Enamel Painting.

NIGG. Painter in the Imperial Porcelain Manufactory of Vienna. The Holy Family, after a picture in the Imperial Gallery at Vienna, attributed to Raphael. In this copy the forms are rendered with tolerable fidelity, but the pale tone of the flesh very inadequately represents the warm powerful colouring of the original picture. The artist has succeeded better in a flower-piece, in which the colours of the flowers are most carefully rendered in all their original truth and force. Honourable Mention. (Cat., p. 203, No. 615.)

Painting on Glass.

G. BERTINI, of Milan. A design, in the centre of which the poet Dante is represented seated; on his right hand is Matilda, on his left Beatrice. This picture is set in an architectural frame, in the Gothic style. It is very seldom that we find in glass painting so much artistic expression as has been attained in the figures, more especially the female figures, in this work; and their effect is heightened by the remarkable harmony of the deep soft colouring. But, on the other hand, the architectural frame is utterly at variance with the taste and principles of construction in Gothic architecture; and two great black spaces, in the upper part of the picture, have a very disagreeable effect, from their contrast to the rest of the design, which is meant to produce the impression of a picture. From the arbitrary mixture of the Architectonic and Pictorial systems of glass-painting in this work, its effect as a whole cannot be agreeable to the best judges. Prize Medal. (Cat., p. 11, No. 737.)

P. BAGATTI VALSECCHI, of Milan. A painting on glass, representing Lucia Mondella, the heroine of Manzoni's celebrated romance, the "Promessi Sposi." As a specimen of *genre* painting on glass, this work is very remarkable in drawing, colour, general effect, and manner of execution. Honourable Mention. (Cat., p. 203, No. 616.)

Lithochromy.

THE IMPERIAL PRINTING OFFICE OF VIENNA. The work, "Paradisus Vindobonensis," exhibited by this establishment, contains a great number of lithographs of flowers and plants, which are represented in form, colour, and every other respect, with remarkable truth to nature. Prize Medal. (Cat., p. 199, No. 362.)

ITALY.

The Italian sculpture of the present day cannot be described as possessing any one general character; some of the modern school still imitate the style of Canova, as, for instance, Bienaimé; others, again, like Tenerani, follow rather in the steps of Thorwaldsen; others, like Marochetti, have devoted themselves, in conception and representation, to the romantic school.

SARDINIA.

D. W. BARON MAROCHETTI. This artist, though educated in France, and at present settled in England, is by birth a subject of the King of Sardinia, so that it

is most proper to place him under the latter country. He exhibited a colossal equestrian figure of Richard Cœur de Lion, modelled in plaster and bronzed, and placed in the open air at the west end of the Building. Richard is represented in mail, mounted on a fine charger. The frank and noble conception of the chivalrous king, holding up his sword in his right hand, and the spirited action of the horse, make this a very remarkable work. In some parts, however, of the modelling of the horse there is a want of knowledge. The hind quarter and hind legs, especially, have rather a lame appearance, and the execution of this part of the horse is very imperfect; the disposition of the veins particularly is altogether arbitrary. The artist has, however, exhibited within the Building a horse's head finished in detail, and from this sample we may see that certain further modelling may much improve the general effect. Council Medal. (Cat., p. 8, No. 76.)

NICOLAS LENDY, engraver at the Royal Mint of Turin. This artist exhibited nine microscopic dies of coins as examples of a process invented by himself, by which dies may be reduced with extraordinary accuracy to a scale, the minuteness of which is hardly credible.

Though the inscription and design on these dies can only be discerned by the aid of a very powerful microscope, the details are rendered with extreme fineness. (Cat., p. 301, No. 60.)

TUSCANY.

Among the works exhibited by this country are a Bacchus by NENCINI (No. 108), a Psyche by FRECCIA (No. 110), and a Dying Gladiator by COSTOLI, all in marble. These three works, though not without merit, must be reckoned of very subordinate rank, when we remember the great celebrity of Tuscany in art; they have, however, received Honourable Mention.

Sculpture on a small Scale.

A wardrobe and jewel-casket, by BARRETTI, of Siena, are, both in taste and execution, most remarkable examples of the rich style of decorative carving of the sixteenth century, commonly known as the cinque-cento style; though these works, therefore, have already obtained a Prize Medal, in Class XXVI, they cannot pass unnoticed here.

L. BIGOTTI. The ornaments carved in ivory by this artist show a good taste, and are carefully executed. Honourable Mention. (Cat., p. 319, No. 78.)

GRAPHIC DELINEATIONS ON PLANE SURFACES.

Inlaid Works in Pietra Dura.

This kind of art has been carried to great perfection in Tuscany, and its cultivation there for so long a period has supplied most of the palaces in Europe with works in pietra dura, which rank among the finest examples of decorative furniture.

No first-rate specimen was contributed to the Exhibition; there are, however, several table-tops by G. BIANCHINI, which must be considered very remarkable works, on account of the taste displayed in the composition of the flowers and leaves, and the care bestowed on the execution. They, therefore, received a Prize Medal from the Jury of Class XXX., as well as from that of Class XXVII. (Cat., p. 320, No. 113.)

ROME.

Sculpture on a large Scale.

It is to be regretted that the most distinguished artists of Rome, and especially Tenerani, the greatest living sculptor of Italy, sent no specimens of their works to the Exhibition.

Two groups, of a little girl with a dog, by G. M. BENZONI, may be noticed here. In one of these, the child is represented drawing a thorn out of the dog's foot; in the other, the dog, after having killed a snake which was threatening an attack, seeks to awaken the child thus rescued. The motive of these works is attractive, and they are carefully executed in marble, but they are by no means of sufficient importance to be considered adequate representations of the modern school of sculpture of such a city as Rome. Prize Medal. (Cat., p. 295, No. 16.)

I. ENGEL, of Hungary. A group in marble, representing an incident in the myth of the Argonauts and Amazons. This composition is not happy in its lines, and the figures are somewhat deficient in character, but the execution is careful. Though this artist is not an Italian by birth, yet, as he received his artistic education in Italy, this seems to be the most proper place for the notice of his work. Honourable Mention. (Cat., p. 8, No. 15.)

Cameos.

Fair specimens of this kind of art, which has been so much esteemed at Rome, and cultivated with such great results, have been contributed to the Exhibition in a series of cameos, cut on shells, by the well-known gem-engraver Saulini. The greater part of these are copied from the most attractive works of the celebrated English sculptor, Gibson. Honourable Mention. (Cat., p. 295, No. 24.)

Mosaics.

This class of art, in which the artists of Rome have so long maintained the first rank, and produced such wonderful results, was far more abundantly and adequately represented in the Exhibition, than the other branches of Roman art which we have already noticed.

BARBERI. A table-top, on which are represented views of celebrated cities in Italy, such as Rome, Florence, Venice, Pisa, &c. These views are arranged in a border round the table; in the central area thus encircled is a representation of the sky. Both in the choice of the subjects of the views, and in the force and refinement of execution, this work is among the most remarkable specimens of mosaic that have been produced. There is, however, rather a want of taste in the form and colour of the ornaments which compose the outermost border of the design. Although this work has been distinguished by a Council Medal in Class XXVII, I have thought it necessary to notice it here, on account of its remarkable character as a work of art. (Cat., p. 295, Col. 1, No. 15.)

The Mosaic Manufactory at St. Peter's exhibits two excellent specimens by CASTELLINI. One of these, representing a colossal three-quarter portrait of Pope Boniface II., is an example of the ancient style of mosaic, intended for the decoration of churches, and for distant effect. The other specimen is a half-length

portrait of St. John, by GUERCINO. This work shows with what wonderful precision a picture, executed in a period when technical knowledge had been fully attained, may be reproduced in mosaic, with a perfect rendering of the forms, colouring, and general effect. Prize Medal. (Cat., p. 295, No. 23.)

B. BOSCHETTI, of Rome, exhibits two mosaics for table-tops, remarkable for their taste and execution; those have obtained Honourable Mention. Awarded Prize Medal. (Class XXVII., Cat., p. 295, No. 17.)

Three Roman artists in mosaic, DOMINICO MOGLIA (awarded Honourable Mention, Class XXVII.), the CAVALIERE LUIGI MOGLIA (awarded Prize Medal, Class XXVII.), and ROCCHIGIANI, have severally contributed to the Exhibition views of the temples of Pæstum, this subject being a favourite one among the Roman mosaicists. These views are executed on a considerable scale. All these artists deserve praise for the truth and careful execution displayed in their works, but the mosaic of Rocchigiani is distinguished from the rest by the force of the effect, and depth and warmth of the colouring. An Honourable Mention has been bestowed on these three artists. (Cat., p. 295, No. 21, 20, 22.)

BELGIUM.

In this country, notwithstanding its moderate size, there is so general a diffusion of talent and feeling for the Fine Arts, that they have been more freely developed here than has been the case in other countries far greater in extent of territory. Hence within the last twenty-five years, side by side with the flourishing school of painting in Belgium, has grown up a school of sculptors, among whom are many distinguished names. In this school of sculpture a tendency to the picturesque, which is in conformity with the whole bent of the nation in art, manifests itself in the general character of the composition, and in a peculiar treatment of the surfaces, in which there is always a certain roundness and fulness, and sometimes an exaggerated development. In many ideal subjects this treatment has a very attractive effect, but in some of the works of Belgian sculptors the want of a proper feeling for bony structure in the representation of the figure, and the affectation of the motive, show that the style of Canova has exercised an unfavourable influence on this school. In portraiture the sculptors of Belgium have shown great ability; in this branch of art the whole Realistic tendency of the national mind has found free scope.

Nearly all the distinguished sculptors of this school sent works to the Exhibition, though in some cases it can hardly be thought that the merits of the sculptor were adequately represented by the specimens he contributed.

A. SCULPTURE AND WORKS OF PLASTIC ART.

Sculpture on a large Scale.

E. SIMONIS. A colossal figure of Godfrey of Bouillon on horseback, raising the banner with which he led the Crusaders to the Holy Land. Cast in plaster from the original in bronze, which is placed in the Place Royale at Brussels.

In this work the expression of the head is full of life and animation, the action very emphatic, the execution very careful. To compensate for the optical diminution which causes statues placed in the open air to appear meagre and deficient in

mass, the artist has in this group exaggerated the forms both of the warrior and the horse. This departure from nature has perhaps been carried too far, and the principles of Plastic Art have been thus lost sight of in the treatment of the surfaces. It may also be remarked that in the side view the form of the horse presents two lines which are too parallel, and by no means happy.

In his group representing Truth trampling on Falsehood, the same artist has shown power in the representation of delicate feminine forms, and the work is carefully executed. The subject, however, is not indicated with sufficient clearness. Two figures of boys, one of whom is crying over his broken drum, prove that M. Simonis has also been successful in that class of subjects called "genre," and which are altogether treated in a Realistic manner. Prize Medal. (Cat., p. 213, No. 464.)

C. A. FRAIKIN, of Schaerbeck, near Brussels. A figure of Psyche moving lightly forward, and bearing a Cupid on her shoulders. The motive of this figure is spirited, the forms are expressed with great tenderness, and the group presents attractions from several points of view. There is, however, in the movement of the head of Psyche something affected, and in the style of Canova. Prize Medal. (Cat., p. 213, No. 465.)

G. GEEFS, of Schaerbeck, near Brussels. A group, in which the power of beauty over savage nature is allegorically represented by a lion, who is allowing his claws to be cut by a pretty undraped female figure. This work, of which a cast is exhibited in plaster, is very carefully executed as a whole; the forms of the female figure are very pleasing, though the treatment is rather too soft.

The bust of His Majesty the King of the Belgians, exhibited by the same artist, is very spirited, and is carefully executed. Prize Medal. (Cat., p. 213, No. 466.)

J. TUERLINCKX, of Malines. A figure, in marble, representing the celebrated Giotto, when a boy, looking at his first drawing with an expression of joy. The conception of this work is very spirited, and it is carefully executed. Prize Medal. (Cat., p. 213, No. 456.)

C. GEERTS, of Louvain. This artist, the most distinguished for wood-carving in Belgium, executed the carvings for the new stalls in Antwerp Cathedral. His chief contribution to the Exhibition is a "Coronation of the Virgin," executed in wood. In this work the artist shows a great knowledge of the Gothic style in the motive of the figures, the expression of the heads, and the manner in which the folds of the drapery are disposed. There is, however, somewhat too much of systematic uniformity in the character of the heads and drapery. Prize Medal. (Cat., p. 213, No. 450.)

JOSEPH GEEFS, of Antwerp. "The Faithful Messenger." In the work so entitled the sculptor has represented a dove perching on the shoulder of a young girl, to whom it has returned. This statue is very pleasing, but is hardly a work of sufficient consequence to give an idea of the distinguished merits of this artist. Honourable Mention. (Cat., p. 213, No. 451.)

J. JAQUET, of Schaerbeck, near Brussels. A group, in plaster, of Cupid asking Venus to restore his bow, which she has taken from him. This work is pleasing, though somewhat affected in motive. The execution is careful, though the development of the muscles, particularly on the back and shoulders, is too strong. Honourable Mention. (Cat., p. 213, No. 461.)

Sculpture on a small Scale.—Medals.

L. J. HART, of Brussels. Thirty-nine Medals, among which a portrait of Rubens may be particularly noticed. These works show very considerable skill in the class of art in which they are executed. Honourable Mention. (Cat, p. 213, No. 441.)

C. JEHOTTE, of Liège. A series of Medals by this artist are also skilfully executed. Honourable Mention. (Cat, p. 213, No. 447.)

B. GRAPHIC REPRESENTATIONS ON PLANE SURFACES.

Inlaid Works in Metal.

J. FALLOISE, of Liège. A shield, some drinking cups, a vase, an armlet, all in steel, inlaid with silver. The masterly execution, refined taste, and correct style shown in these works, place M. Falloise in the first rank in the class of Workers in Metal. Prize Medal. (Cat, p. 212, No. 384. Awarded Prize Medal, Class XXIII.)

SWITZERLAND.

J. LEEMANN, of Zürich, a bookbinder. The model of the Cathedral of Strasburg, executed in cardboard with a penknife. This model deserves special notice, on account of the correctness of the proportions, and the labour and dexterity shown in the execution. Honourable Mention. (Cat, p. 313, No. 257. Awarded Prize Medal, Class VII.)

J. LEEMANN, of Berne.* The model of the beautiful Fountain at Nuremberg, executed in wood with the utmost truth of detail. Honourable Mention. (Cat, p. 313, No. 258.)

SPAIN.

Inlaid Works.

(a.) In Wood.

PEREZ and Co. A manufactory for inlaying wood at Barcelona. A table-top, inlaid with a variety of ornaments, in the centre of which are the Royal Arms of Great Britain. The patterns, with a few exceptions, are in admirable taste, the colouring exquisite throughout, the execution of extraordinary fineness, the most minute particles of wood being employed to express the faintest gradations of colour. Altogether this is a work of the highest rank in its class. Prize Medal. (Cat, p. 307, No. 271A.)

(b.) In Metal.

E. ZULOAGA. The proprietor of an establishment at Madrid for works in metal, from which were exhibited various specimens executed in iron, inlaid with gold and silver, and ornamented with reliefs. These works are of rare excellence in every respect, both as regards the taste of the patterns and the artistic style of the execution. Among the most remarkable are a chest, worthy to receive the muniments of the proud nobility of Castile, two pairs of pistols, a couteau de

* It has been already pointed out, in the Report of Mr. Panizzi, that the model of the Fountain of Nuremberg is executed by the same artist as the model of Strasburg Cathedral which precedes it.

chasse, and a sabre. Honourable Mention. Awarded Prize Medal, Class XXIII. (Cat., p. 307, Nos. 26+ and 26+A.)

THE ROYAL ORDNANCE MANUFACTORY OF TOLEDO exhibits a number of works inlaid in the same manner, among which may be particularly noticed a dagger. Honourable Mention. (Cat., p. 307, No. 266.)

DENMARK.

Sculpture on a large Scale.

It was for this country that the great Thorwaldsen embodied his spiritual conceptions in such a number of masterpieces of sculpture ; and there are not wanting in Denmark at the present day distinguished sculptors who follow in his footsteps with greater or less success.

J. A. JERICHAU, of Copenhagen. Group of a Panther and Hunter. The animal has fastened on the hunter as he is carrying off one of her cubs ; he is about to pierce her with his spear.

This group is full of life, and finely conceived, the execution shows great knowledge, and careful minute labour in the details. It should, however, be noticed that the artist has missed the true proportions in the legs of the hunter, which are too short.

Another group, by the same artist, " Eve after the Fall," leaning on the seated figure of Adam, has great merit. Equal praise is due to him for a bas-relief intended to form part of a frieze ; a drawing of the whole design gives a very favourable impression of it. Prize Medal. (Cat., p. 217, No. 39.)

H. W. BISSEN, of Copenhagen. A figure of Orestes in rapid movement, and brandishing a sword. In this work the conception is full of life, and the momentary character of the action well rendered ; the expression of the countenance is noble, the execution careful. Honourable Mention. (Cat., p. 217, No. 38.)

Sculpture on a small Scale.

C. G. KLINGSEY, of Copenhagen. A jewel casket in ivory, ornamented with reliefs, after celebrated works by Thorwaldsen. The artist has shown a highly cultivated taste and correct feeling for style, not only in the general form of this casket, but in the adaptation of the reliefs to so small a scale, and in the architectural ornaments. This work is also to be especially commended on account of the great care shown in its execution. Honourable Mention. (Cat., p. 217, No. 34.)

RUSSIA.

It is to be regretted that Russia has contributed to the Exhibition no specimen of sculpture on a large scale, although we could here mention two distinguished Russian names—that of R. M. Von Launitz, now residing at Frankfort, a sculptor full of talent ; and the well-known Baron Kloth, of St. Petersburg, who in the representation of horses studied from the life, is one of the most distinguished artists of modern times. His groups of horses, with their trainers, at St. Petersburg and Berlin, may be cited in proof of his merits.

Count TOLSTOY, President of the Royal Academy of Arts at St. Petersburg,

exhibits plaster casts of a series of medallions, on which are represented in relief the incidents of the successful war carried on by Russia against France, from 1813 to 1814. These works are well known to all connoisseurs, and deserve notice on account of the invention shown in the designs, some of which are very happy; the execution is also careful. Honourable Mention. (Cat., p. 300, No. 328.)

N. KOBNILOFF, a painter in the Imperial Porcelain Manufactory of St. Petersburg, exhibits a copy of a landscape with cows, by Berghem, in which the characteristics of this master, both in form and colour, are rendered with remarkable truth and admirable execution of the details. Prizo Medal. (Cat., p. 300, No. 318.)

Lithochromy.

F. DREGER, of Moscow, for an illustrated work, in which furniture and other examples of mediæval decoration are represented in a very masterly manner. Honourable Mention. (Cat., p. 300, No. 362.)

It is to be regretted that so distinguished an artist as Fogelberg, now living at Rome, did not contribute any work to the Exhibition on behalf of the school of his native country, Sweden; and that in like manner the Netherlands were not represented by Roger, the Director of the Academy of Art at Amsterdam, an admirable sculptor in the Realistic style. The works of both these artists would have shown the great excellence of the respective schools of sculpture to which they belong.

THE UNITED STATES OF AMERICA.

The American States, which in the course of a few generations have established so vast a scheme of municipal and political institutions, have attained to great perfection in many branches of industry, and are now beginning to turn their attention to the sciences, and also to those arts which minister to the spiritual rather than the animal wants of man, and which have for their high purpose the investigation of truth, and the expression of beauty through form.

All who have truly at heart the advancement of civilization, and regard it as the common good of mankind, must sincerely rejoice at the success which has attended this new movement of the American mind.

Sculpture on a large Scale.

Several natives of the United States may be mentioned who have attained proficiency in this difficult branch of art, which cannot be acquired without a certain course of training. I am acquainted with the works of two American sculptors, Greenough, and Hiram Powers, of whom the latter alone contributed to the Exhibition, and was only represented there by two specimens of his works:—1. The Greek Slave. In this work a youthful creature of very delicate form is represented in marble. The figure is studied from the life, and exhibits an extraordinary refinement of imitation. The treatment of the back, especially, is one of the happiest efforts in modern sculpture. It should be noted, however, that the manner in which the right hand of this figure is made to lean on the trunk of a tree, while at the same time the real support of the body is on the left leg, gives an appearance of uncertainty to the motion of the whole figure, and deprives it of that charm of contrast, which the sculptors of antiquity imparted to their

statues by throwing the weight of the figure decidedly on one side, so as to leave the other side free. It may be added, that the expression of gentle endurance and resignation which characterizes the head by no means serves to indicate the subject represented by this figure; the sculptor has, therefore, been obliged to have recourse to the symbol of the marble chain, to justify more fully the title which he has given to this work. 2. A Fisher Boy, listening attentively to the murmur of a shell. A youthful refined figure, sculptured in marble; the execution is careful, but not equal to that of the Greek Slave. Prize Medal. (Cat., p. 11, Nos. 522 and 547.)

Fine Art Casting.

The art of casting sculpture in different metals is obviously of the greatest importance for the diffusion of the finest works. I should not be therefore justified were I to pass over the specimens of Fine Art casting in the Exhibition, though these have been already examined and rewarded by the Jury of Class XXII.

The following artists and directors of foundries may be particularly noticed :—

(a.) Castings in Bronze.

ENGLAND. The COALBROOKDALE COMPANY, in Shropshire. The cast of Bell's figure of the Eagle-slayer shows great perfection, both in the casting and subsequent tooling.

J. A. HATFIELD, of London. "Foley's Youth at the Stream." This work is deserving of notice, as a remarkable specimen of casting.

ZOLLVEREIN. The foundry of Count G. EINSIEDEL, of Lauchhammer, in Prussian Saxony, exhibits a great number of large and important specimens of casting. Among them may be especially noticed the figure of a Girl at the Fountain, by Wichmann, a very good example of casting and tooling.

FRIEBEL. This artist has executed, at Berlin, the whole of the casts of Rauch's monument of Frederick the Great. A Newfoundland Dog, after a model by Moller, and remarkably well cast and tooled, and a number of smaller figures, were exhibited by this artist.

C. U. FISCHER, of Berlin. This artist also exhibited a great number of casts, among which may be especially noticed an Eagle, and a Danaid, after Rauch.

KESLER, of Greiswald. The figure of the Muse Polyhymnia, in the Royal Museum at Berlin; a very successful specimen of raw casting.

MILLER, director of the celebrated Royal Bronze Foundry at Munich, an establishment which has accomplished much under his management, and which, under its late director, Stiglmeier, had already produced such an abundance of castings, and on so colossal a scale.

Those executed by Miller are the Lion, which has been already noticed in this Report, and the two noble figures by Schwanthaler, the first of these being a specimen of raw casting, and the two figures being tooled.

These works are most admirable for the sharpness and clearness of the casting, and also for the beautiful subdued colour of the bronze.

FRANCE. ECK and DURANT, of Paris. The Dancing Satyr, by Lequesne; an excellent cast, well tooled.

QUESNEL, of Paris. The Venus and Cupid, by Pradier, and the group of a Hunter killing a Stag, by Jean Debay, are also well worthy of notice.

SIMONS and SONS, of Paris. The Bust of a Negro, by Cordier ; a masterly specimen both of casting and tooling.

(b). Castings in Zinc.

ZOLLVEREIN. M. GEISS, of Berlin. In the establishment of this artist the casting of zinc has been brought to remarkable perfection, and works of sculpture, of a colossal and of the smallest scale, as well as architectural ornaments of the most refined taste, have been reproduced in this material.

By a process recently introduced, copper is deposited on the zinc by galvanic action ; a bronze surface is thus produced, which is as beautiful as it is durable. The Exhibition contained the following admirable examples of the casting of this establishment :—The Amazon, by Kiss ; the Hebe, by Canova ; the Boy with the Swan, by Kalide ; Baily's Eve ; the celebrated figure in the Glyptothek at Munich, known as the "Ilioneus," or the "Niobid ;" two Stags, by Rauch ; also a Corinthian and an Ionic Capital.

I am of opinion that the Council Medal was quite as fully deserved by this establishment as by that of the "Vieille Montagne."

SP. DEVARANNE and SON. This firm has also brought the art of casting in zinc to great perfection, and exhibited a number of works of the same kind as those contributed by Geiss.

Out of this great collection the following may be mentioned as most worthy of notice : the Venus, by Canova ; a Lion and a Panther, life-size ; and the Danaid, by Rauch.

BELGIUM. The establishment called "La Vieille Montagne," in Belgium, which has produced a number of zinc castings of remarkable excellence, has exhibited one most masterly specimen, Her Majesty Queen Victoria, seated on her throne.

(c). Castings in Iron.

ENGLAND. The COALBROOK DALE COMPANY. A very successful cast of Bell's Eagle-slayer.

ZOLLVEREIN. The ROYAL IRON-FOUNDRY, of Berlin. The great importance of this establishment has been already pointed out in the notice of the several specimens exhibited by it. The process of Galvanoplastic deposit may be here also noticed, as another mode by which sculpture may be reproduced with accuracy, and at a reasonable cost.

JULIUS WINCKELMANN, proprietor of a Galvanoplastic establishment in Berlin. The statue of Frederick William II., Elector of Brandenburg. This work is very remarkable on account of the great sharpness of the forms.

C. WAAGEN, *Reporter.*

November 1851.

SUPPLEMENTARY REPORT ON DESIGN.

By RICHARD REDGRAVE, R.A.

It was the original intention of Her Majesty's Commissioners that all exhibited "Designs" should be referred to the consideration of the Juries of the respective Classes to whose award the *fabrics* to which such designs were applied, or intended to be applied, were submitted. It was subsequently determined that it would be more advisable that this duty should be undertaken by the Jurors of Class XXX., assisted by associated Jurors from the various Classes of manufactures designed for. The awards on design will therefore be found among those of the Jury of Class XXX.

With a view to the permanent record of the opinions formed on the careful examination entailed by their duty, Her Majesty's Commissioners directed a Report to be drawn up by one of the members of the Jury, which should not be limited to the merits of the "Designs" exhibited, but should have regard to the general state of design as applied to the various fabrics and manufactures in the Great Exhibition.

Such then are the objects to be embraced in this Report, and they form an extensive and onerous duty to be fulfilled by any one individual. When the varied applications of design and ornamental decoration called for by the different uses, materials, and modes of manufacture are considered, and the vast multitude of objects to which they are applied (all more or less requiring examination), the task of the Reporter will be seen to be one of great difficulty and labour, in the execution of which he trusts peculiar indulgence may be claimed.

The desire evinced by the rudest as well as the most civilized nations for the decoration of their buildings, utensils, and clothing, almost raises ornament into a natural want, and must render its proper application of the utmost consequence to the manufacturer, since upon it the value of his manufactures in the various markets of the world greatly depends. It can hardly be possible, therefore, that any one should doubt, on the present occasion, the importance of a careful review of the union of design and ornament to manufacturing skill, since all that the inventive powers, the fancy, and the handicraft of man can do has this year been gathered into one place, and the world been invited to consider and examine it. But without some critical guidance, some judicial canons, or some careful separation of the meretricious from the beautiful, it is to be feared that the public taste will rather be vitiated than improved by an examination of the Exhibition, as it will readily be allowed that the mass of ornament applied to the works therein exhibited is of the former character, and from that very cause more likely to impose on the uninformed taste of the multitude than the simpler qualities of real excellence to impress us with a just sense of their worth. Such considerations were, doubtless, among the reasons which influenced the determination of the Royal Commissioners on this subject.

We have spoken of design and of ornamental decoration. These are two essentially different things, and it is highly necessary that they should, from the

first, be considered as separate and distinct. "Design" has reference to the construction of any work both for use and beauty, and therefore includes its ornamentation also. "Ornament" is merely the decoration of a thing constructed.

Ornament is thus necessarily limited, for, so defined, it cannot be other than secondary, and must not usurp a principal place; if it do so, the object is no longer a work ornamented, but is degraded into a mere *ornament*. Now the great tendency of the present time is to reverse this rule; indeed it is impossible to examine the works of the Great Exhibition without seeing how often utility and construction are made secondary to decoration. In fact, when commencing a design, designers are too apt to think of ornament before construction, and, as has been said in connexion with the nobler art of architecture, rather to construct ornament than to ornament construction. This, on the slightest examination, will be found to be the leading error in the Exhibition, an error more or less apparent in every department of manufacture connected with ornament, which is apt to sicken us of decoration, and leads us to admire those objects of absolute utility (the machines and utensils of various kinds), where use is so paramount that ornament is repudiated, and, fitness of purpose being the end sought, a noble simplicity is the result.

The primary consideration of construction is so necessary to pure design, that it almost follows that, whenever style and ornament are debased, construction will be found to have been first disregarded; and that those styles which are considered the purest, and the best periods of those styles, are just those wherein constructive utility has been rightly understood and most thoroughly attended to. A dissertation upon difference of styles would be out of place in this Report, as well as an expressed preference for any particular one, since each, doubtless, contains some qualities of beauty or excellence which will justify its use when restrained and regulated by fixed principles. It may not, however, be improper to illustrate by a few remarks the opinion expressed above, since it involves important principles connected with a proper consideration of works coming within the scope of the Report.

To begin with the ecclesiastical architecture of the middle ages: when the style was purest, the construction was most scientific, the arches were best formed for resistance, the groining elevated and simple, the ornament modest and applied to the forms of construction only. As the style progressed with time, it departed from its primitive simplicity: it became more ornamental, it is true, but at the sacrifice of some of its constructive truth: the use of the arch was partly obscured by its being placed under a horizontal arrangement, and supported by perpendicular mullions, and it was gradually flattened to the worst form for sustaining pressure. The groining, at first simple, became a most elaborate system of reticulation, by its numerous lines reducing the apparent height of the roof, to the entire loss of the sublime effect produced by its elevation and simple groining in the earlier period. At the same time the enormous pendants seemed ready to fall on the heads of the beholder, and to bring with them the flattened arch of which they were the key-stones. The exterior was everywhere decorated, effecting the ruin of the building by the dust and moss which this humid climate soon engendered. In its last period, decoration could be carried no further, and Gothic architecture, which had grown into glory and beauty, from its just and

scientific construction, was thrown aside when a florid ornamentation had taken the place of constructive truth. It was succeeded in this country by the Tudor style, a modification of the Renaissance. The Renaissance itself arose mainly from the study of Roman remains, and those often of the worst period of the Empire, when Greek science, skill, and pure taste had fallen before Roman magnificence and barbarism, and before modern discoveries had opened up the Athenian treasures of Greek art. It was introduced, however, by men of enlarged minds, most of them great constructive architects, and by them it was constructively adapted; they embodied in it many of the just principles of the ancient styles; and if the stream of tradition had brought down much rubbish as well as treasure, still the master minds of the fifteenth century gradually separated them, and applied with unrivalled skill and a fertile fancy what was beautiful and good. It was, however, essentially pagan in all its details, and its ornament conveyed no symbolic truths to the hearts of men. In the hands of less skilful masters it soon became decoration without a pervading spirit, ornament merely used as ornament, without propriety as without meaning; and thus, as the Tudor style, it succeeded in this country to the Gothic, that style dying out, partly from the causes above stated, and partly from the change of feeling consequent on the reformed opinions which then prevailed. This debased form of the Renaissance, in its decoration, had already cast off all constructive truth and consistency: much that was bad in the late style was retained and mixed with it; whatever was good was as certainly forgotten. Columns were reversed, the heavy and broad part being upwards, the small part below; they swelled alternately into enormous bands, and were contracted into severing rings, and sometimes they stood upon balls to give a further sense of insecurity. Terminal figures were introduced which had the weight of their entablatures borne on baskets of imitative fruits or flowers. The covering pediments were broken, contrary to all constructive application, or were placed successively one within another: entablatures were enlarged out of all proportion to the supporting columns; and the useful was superseded by the ornamental.

In France first, and afterwards in all the countries of Europe, the Renaissance was degraded into the style known as that of Louis Quatorze. In all that this style differed from the true Renaissance, it differed merely as arising out of decoration. As a style it never had a commencement in construction, as the Gothic and Renaissance had, both of which were founded on an architectural basis; *this* sprang from the love of the Grand Monarque for magnificence and display. In it, all that was constructively true was disregarded utterly and systematically; thus supports became curved and broken in line exactly where they required strength, bearing-rails were severed in the centre where the greatest bearing was, the union of horizontal and perpendicular forms was suppressed, styles and rails as far as possible hidden, veneers applied with the grain across the framing, and every effort of invention strained, not to decorate the due constructive truth of things, but utterly to hide and abolish construction altogether. The ruling principle of the style, as far as it can be said to have had one, was the avoidance of symmetry, and the search after variety by every possible means: for this reason central forms had disymmetrical sides, and the most unequal division of parts was the rule of composition. Nevertheless, for the purpose which called it forth, for mere mag-

nificence and display, it was admirably adapted, being one of the most suitable styles for the display of gilding, and for brilliancy and sparkle in metal and ormolu work, showy and glittering beyond anything attainable in the simpler forms of the Renaissance or of classic antiquity. From these qualities it has long maintained its hold on the public taste; and its florid and gorgeous tinsel still prevails in three-fourths of the works of the Great Exhibition, notwithstanding its gross contempt of constructive principles.

The ornament of past ages is the *tradition* of the ornamentist, and tradition ever hands down to us things good and bad, both equally consecrated to most minds by the authority of time. But a moment's reflection will show how necessary it is to discriminate before receiving anything on such authority. A church or temple built in a rude age remains undisturbed by some happy chance, a villa or a theatre in a remote provincial town escapes the fatalities of accident or time, some tomb is opened, some overwhelmed city exhumed from the *débris* of ruin that had gathered over it. The ornamental details found therein are copied and illustrated by the notes of antiquarians, or published in the proceedings of learned societies, and are at once regarded as authorities for imitation, it being forgotten that they were perhaps the works of obscure provincial artists, of a barbarous age perchance, or of a people with whom *art*, no longer studied for its principles, had ceased to progress or had rapidly declined.

Such traditional ornament moreover had or had not a local use, a consistent application to domestic, ecclesiastical, or funeral purposes, in fact a local symbolism; but even if it had, this, mostly overlooked, is sure to be soon disregarded; and not only have we ornament of a degraded period, of a declining age, or by inferior artists, but to this must be added, that its symbolic life is totally extinct, and, perhaps, fortunately so, for when revived it is indiscriminately used, for purposes totally at variance with its first application and original intent. Moreover, the ornament suited for one material is misapplied to a material different from that for which it was designed. Thus ornament originally carved in stone is used for metal or for wood, or, worse still, for carpets or for dresses. That which was intended to be carved in relief is imitated as the inlay of a floor or the hanging of a wall, and senseless anomalies of all kinds speedily arise from undue reverence for and indiscriminate use of traditional ornament. That this is no forced view of things, a glance at the Exhibition will at once show, wherein are to be seen the sacred vessels of the church imitated for secular purposes; the funeral urns of the Greek revived as drinking-vessels for the table; the columns of temples turned into candlesticks, and sarcophagi into wine-coolers; while the decorations of ceilings are applied to carpets, and the carved frieze of an Ionic temple to a muslin curtain: all these errors arising from the indiscriminating use of those materials with which antiquity has supplied us.

Ornamentists may fairly be divided into two classes: the traditional, who superstitiously reverence the remains of past ages and are wedded in practice to existing styles; and those who despise the past and feel themselves at liberty to adopt from the abundant sources of nature a mode and manner for themselves, without regard to the works of their predecessors. The first class simply seek to follow where precedent leads them, and to be able to claim the sanction of authority for their works. These, even when taste duly regulates their choice, are men of limited

ideas and small progress. Those of the second class, who pay no deference to authority, who think that ornament is governed by no laws, and who see no principles by which they are to be guided, are little likely to raise the art to the level of past times, and, still less, to advance its aim and widen its scope. The true ornamentist would seem to be one who seeks out the *principles* on which the bygone artists worked, and the rules by which they arrived at excellence, and, discarding mere imitation and reproduction of details, endeavours, by the application of new ideas and new matter on *principles* which he believes to be sound, or which time and the assent of other minds has approved to be fundamental, to attain originality through fitness and truth. The antiquarian ornamentist, however, will always have a certain reputation, and justly, if he has the taste to select what is best from the great masters of past times. In any case the critic must be bold who speaks against the authority of the fathers of the art; and praise is safe when great names are on the side of the critic. From this class of ornamentists we may at least demand purity of style, that marked eras should be kept distinct, and that the adopted ornament should be fitly applied to fabrics or manufactures of the like nature, and, as far as possible, for the like uses, as those for which the ornament was first designed.

From the labours of the second class of ornamentists, united to that constant search after novelty at any sacrifice of true taste for which manufacturers are so constantly urgent, there has arisen a new species of ornament of the most objectionable kind, which it is desirable at once to deprecate on account of its complete departure from just taste and true principles. This may be called the *natural* or merely imitative style, and it is seen in its worst development in some of the articles of form.

Thus we have metal *imitations* of plants and flowers, with an attempt to make them a strict resemblance, forgetting that natural objects are rendered into ornament by subordinating the details to the general idea, and that the endeavour ought to be to seize the simplest expression of a thing rather than to imitate it. This is the case with fine art also: in its highest effort mere imitation is an error and an impertinence, and true ornamental art is even more opposed to the merely imitative treatment now so largely adopted. Let any one examine floral or foliated ornament produced in metal by electrotyping the natural object, whereby every venation and striation of the plant is reproduced, and compare it with a well and simply modelled treatment, where only the general features of the form are given and all the minutest details purposely omitted; and if this latter has been done with a true sense of the characteristics of the plant, the meanness and littleness of the one mode will be perfectly evident, compared with the larger manner of the other. But this imitative style is carried much further: or-molu stems and leaves bear porcelain flowers painted to imitate nature, and candles are made to rise out of tulips and chinaasters, while gas jets gush forth from opal arums. Stems, bearing flowers for various uses, arise from groups of metal leaves standing tiptoe on their points, and every constructive truth, and just adaptation to use, is disregarded for a senseless imitative naturalism. In the same way, and doubtless supported by great authority, past and present, enormous wreaths of flowers, fish, game, fruits, &c., imitated à merveille, dangle round sideboards, beds, and picture-frames. Glass is tortured out of its true quality to make it into the cup of a lily

or an anemone : not that we may be supposed to drink nectar from the flower, but that novelty may catch those for whom good taste is not piquant enough, and chaste forms not sufficiently showy. In fabrics where flatness would seem most essential, this imitative treatment is often carried to the greatest excess ; and carpets are ornamented with water-lilies floating on their natural bed, with fruits and flowers poured forth in overwhelming abundance in all the glory of their shades and hues ; or we are startled by a lion at our hearth, or a leopard on our rug, his spotted coat imitated even to its relief as well as to its colour, while palm-trees and landscapes are used as the ornaments of muslin curtains. Though far from saying that imitative ornament is not sometimes allowable, still it will at once be felt that the manner wants a determined regulation to exclude it in most of the above-mentioned cases from all works aspiring to be considered in just taste, and to leave it to be adopted by those only who think novelty better than chaste design, and show preferable to truth.

The constant search after novelty has just been alluded to as one of the sources of bad taste in modern ornament. Manufacturers are eager to obtain it at any sacrifice of truth, and at any cost. The efforts of those past ages, when taste was most indisputable, appear to have been directed rather to the continually perfecting and refining their designs and inventions, than to creating new ones. Thus in architecture the robust simplicity and grandeur of the Doric order remained unchanged from age to age, architect after architect striving only to perfect its just proportions and the symmetry of its parts, rather than to add any novelty of feature or ornament, until, in the Parthenon, it seems to have arrived at the most perfect development that taste, science, and art could unitedly effect. Even among the more voluptuous inhabitants of Asia Minor, at least until the age when their artists became servants and panderers to the coarser magnificence of Rome, the details of ornamentation were few, and those universally received. The volute, the acanthus, the anthemion, the echinus, and a few frets and guilloches, seemed to pass the ordeal of criticism, not that they might be rejected for more novel treatments, but that the symmetry of their parts might be more justly balanced, the commoner curves rejected for those more varied, beautiful, and refined, and the true import given to their projections. Proportion and symmetry being thus sought after instead of novelty, their ornament has come down to us with authority like that of Scripture, rather than of tradition, and all the after efforts of artists, who have adopted and adapted it, have failed to improve its elegance, or to add to its beauty. Even in the eastern nations we find the same usage prevail ; and to this day Indian ornament is composed of the same forms as it was in the earliest known works : the principles that governed ornamental practice in those works seem still to be a tradition with the artist and the workman, and still to produce the same beautiful results, as is abundantly seen in the fabrics and tissues of the Indian Department in the Great Exhibition. Now, however, our efforts are of an entirely different nature, and the hunger after novelty is quite insatiable ; heaven and earth are racked for novel inventions, and happy is the man who lights upon something, however *outré*, that shall strike the vulgar mind, and obtain the "run of the season." Such patterns as often result from the caprice of accident as from any effort of thought—witness what is called the diorama pattern in cotton printing, which was very popular, yet was the result of

an accidental folding of the stuff on the cylinder in printing. Accepted for the season, these fantasies no sooner pass away than the world wonders how it could ever have looked upon them with satisfaction, or tolerated for an instant such solecisms in taste, such strange incongruities, or gross absurdities.

The ornament of past ages was chiefly the offspring of handicraft labour, that of the present age is of the engine and the machine. This great difference in the mode of production causes a like difference in the results. In old times the artist was at once designer, ornamentist, and craftsman, and to him was indifferent the use of the pencil or the brush, of the hammer, the chisel, or the punch: his hand and his mind wrought together, not only in the design, but in every stage of its completion, and thus there entered a portion of that mind into every minute detail, and into every stage of finish, and many a beautiful after-thought was embodied by the hand of the "cunning artificer," many a grace added to the work by his mastery and skill. He worked, not to produce a rigid sameness, but as Nature works:—she produces nothing exactly similar to its fellow; in every turn of every stage of growth, in every flower, and in every leaf, adding a changing grace, a differing beauty; so he varied his labours with every feeling of his overflowing mind. But this is not possible with the stamp, the mould, the press, and the die, the ornamental agents of our days: after the type or model is made, all the products are rigidly the same, whence arises a sickening monotony, a tiresome sameness, unknown in the works of nature and peculiar to these artificial works of man: the varying mind has no share in their production, and man himself becomes only the servant of the machine.

Moreover, the old ornamentist worked generally from feelings of piety, from love of his labours, or from the desire of fame, motives hardly known to the artist of this class in our days, at least in this country—Who seeks fame from the ephemerism of a season? Who loves a labour that is so soon to pass away? Who cares for a work that is not to be the child of his own hand, but to be produced in thousands by the aid of machinery? The toil of him of old times was spent upon the thing itself, and not upon a mere model for it: the chalice, the cup, the lock and key, the reliquary, were to be without repetition, and without rivals: he sought to give them their highest excellence, and, labouring from one of the feelings we have described, threw his whole soul into his work, so that it became a thing for future ages to look upon and to prize. Not that handicraft or art-workmanship is utterly excluded from our manufactures; it is only partially so, making more painfully evident how greatly ornamental art has suffered from its new union with machinery. Wherever ornament is wholly effected by machinery, it is certainly the most degraded in style and execution; and the best workmanship and the best taste are to be found in those manufactures and fabrics wherein handicraft is entirely or partially the means of producing the ornament, as in china and glass, in works in the precious metals, carving, &c. This partly arises from the facilities which machinery gives to the manufacturer, enabling him to produce the florid and overloaded as cheaply as the simple forms, and thus to satisfy the larger market for the multitude, who desire quantity rather than quality, and value a thing the more, the more it is ornamented. This state of modern manufacture, whereby ornament is multiplied without limit from a given model, by the machine or the mould, ought at least to awaken in the manufacturer a sense of the importance of the first

design. One would think that what was to be produced by thousands and tens of thousands should at least be a work of beauty, and no pains be spared to insure its excellence. The cost of the first design or model must in such a case be a mere atom when divided among its myriad prototypes. It would seem strange, too, that any one could be found to throw away great expense upon dies and moulds, to carry out a design which in itself was hardly thought worth paying for. Yet often in this country artists are paid little better than workmen, and a belief seems to prevail, that knowledge, skill, and taste come by nature: the artist has often no interest in the result of his labours, his name is unknown, his pay is niggardly, and what there may be of beauty and excellence in his work is often spoiled by the alterations of the manufacturer, who makes no scruple of setting his own taste above that of the artist, and altering and changing a design at his sole pleasure. In France, and some parts of Germany, where taste has long been cultivated, and the value of ornamental design is better understood, these relations are better understood also; and in this country, if good taste is to prevail, the manufacturer must learn to appreciate more highly the value of the designer's labours, must seek to foster his talents and stimulate his *amour propre*. Society also must be prepared to contribute more largely than heretofore to public education in ornamental art, and taste must be disseminated by every available means; for it is not only truth, but a truth that should be told, that, notwithstanding our skilful workmanship and our excellent manufacture of most fabrics, we are sadly behind in the design applied to them, and greatly indebted to foreign artists even for what little is good. Moreover our greatest difficulty consists even less in the want of designers than of skilled art-workmen to carry out designs. A design for cotton printing may be spoiled by the "putter-on," or for silk by him who prepares it for the loom. The sculptor may design a statuette, but there are few able to chase the bronze, or to retouch the clay, or to unite the parts when they come forth from the mould. Even where such are found, they are mostly men of slow minds, who enter little into the spirit of the artist's labours, and who work without feeling as without fire. We find plenty of chasers able to imitate the fur of animals, or the texture of draperies, but few who understand the bones and the anatomy of the parts, and fewer still who carry an artist's spirit into their works. In painting, also, the painter on glass and china is generally a mere copyist, or he works too entirely by rote, and without feeling. The lily and the rose which he paints are always the same lily and the same rose, a work of the hand and eye, in which the mind has no share. There are honourable exceptions, no doubt, but with the many art is a mere handicraft. In France, in Germany, in Bavaria, in Italy, this is not the case. There the artist often carries out his own design, and, where he does not, has always at hand a band of skilled art-workmen to embody his ideas, or to complete his labours. The beautiful works in metal by VECHE, WAGNER, and WEISHAUP, the china paintings of JACOBBER, SCHILT, DUCLUZEAU, HAMAN, and a multitude of others, and the furniture carvings of LIENARD, are choice examples of the above-stated truths; while the works in oxidized silver, such as seal and knife handles, paper-weights, cigar-cases, &c., exhibited by RUDOLPHI, with the bronzes of MÉNÉ, PRADIER, and a host of other such works, show the skill, taste and knowledge of the art-workmen of France. In France, moreover, there is a

fitness and fancy pervading ornamentation; the ornament, especially where figures and animals are introduced, being specially adapted to the thing ornamented. In England the ornament designed for one work is made to do duty for twenty others: one figure truly plays many parts, and is often used with an inconceivable want of fitness. But the English public, and the English manufacturers as a body, are hardly yet awake on the question of design: Government has established schools of ornamental art in many of our large manufacturing towns for the purpose of spreading genuine taste, and educating our workmen; but they are as yet a forced product, and have hardly anywhere, after ten years of struggle, won the warm support of the local manufacturer. Even in this Great Exhibition, the question of *design* was nearly overlooked, and the works of the designer left without a place: his name was not necessarily coupled with the fabrics or manufactures his skill had designed or decorated, and his reward therefore was left to the good feeling of his employer. No special Jury was named to unite with manufacturers in the various classes in judging of the taste and art displayed in the ornamentation of their fabrics; and that art which, as we have before said, is calculated, when excellent, to raise the reputation of a nation's manufactures, was left to the judgment of those too likely to consider, not its real excellence, but what an untaught multitude would purchase and would prize. In France many large establishments have well-appointed schools attached for teaching drawing and modelling, and the rudiments of science connected with their manufactures. In Germany also, and in Italy, schools and institutions have long been in operation for the cultivation of taste in design; and it will be necessary for this country to enter seriously on the same course, if we are to maintain even our manufacturing reputation before the world.

In estimating the progress of this country in ornament and in art-workmanship as compared with the continental nations, there is one circumstance that must enter largely into consideration. In France, Germany, Italy, and Belgium, in addition to schools for teaching ornamental art, royal and national manufactories have been established for many years. In these no necessary expense is spared to bring to perfection the fabrics wrought in them, both as to the highest excellence of workmanship and materials, and to their embellishment by ornamental design. The best painters, sculptors, and designers, as well as men of the most scientific acquirements in botany, mineralogy, and chemistry, are among their professors; and the works being carried on at the public expense for the attainment of excellence, the cost of repeated failures is unheeded. In such establishments a band of skilled workmen must of necessity be trained to the ultimate benefit of the private manufacturers, and those difficulties which science had found the means of overcoming, or those new processes and new materials which it had brought to light, be spread abroad for the common advantage of all. Moreover, the sight of excellence and of the products of skilled workmanship is one of the greatest stimulants to further exertion, since all art and all manufacture arrive at perfection by gradual advance on past labours. The workman who sees the results of the skill which has produced such works in china and porcelain as are exhibited in the Sèvres room or in the hall of the Zollverein, must feel this stimulus in no mean degree. When it is remembered what one single artist did in this country for the same manufacture, and how greatly Wedgwood

and his workmen were indebted to Flaxman, we can well feel what influence a band of artists of like ability, exercising their talents to improve every department of the manufacture, and of these a continued succession, would be likely to exercise over the taste and skill of those in contact with them. Nor is this all: the excellence of one fabric awakens a desire for like excellence in others, and calls forth the same spirit of emulation. It surely cannot be doubted, therefore, that the continental nations, and more especially France, in this manufacture, and through it in many others, have been largely benefited by such institutions; besides the amount of national reputation obtained by them from the display of the choice works which are therein produced.

In these remarks it is not intended to plead for the desirableness of such establishments in our own country, but only to point them out as the means whereby other nations have attained to great excellence. It is no answer to such an argument, although it is indeed true, to say that without these aids the *general* manufacture of such fabrics in Germany and France is behind our own; and that the private show of such works by MINTON, COPELAND, and others, is, both as to manufacture and design, superior to that of any private manufacturer of those countries. This may arise from various causes; but with the like advantages on our side it may well be imagined that much greater excellence would have been attained, the want of skilled art-workmen being felt and acknowledged by these manufacturers as a great hindrance to the complete success of their manufacture. Moreover, it is but fair to remember that such royal and national establishments, by the beautiful works produced in them, have added largely to the number of rewards won by other nations in this peaceful contention, and have placed at some apparent disadvantage the manufacturers and workmen of our own country. Let us hope, however, that the time is coming when England will seize eagerly every proper means of improvement. Symptoms of it are already abroad; and there seems a likelihood that the Great Exhibition of the Industry of all Nations will be valuable to all in showing short-comings as well as excellences; and to none will it be more so than to the British nation, if it awakens us to a knowledge of our deficiency in ornamental art, and to a hearty endeavour immediately to remedy it.

It has already been stated that this Report originated in the consideration of "designs." It is proper, therefore, that the works of the designer should be examined and commented on, before the manufactures to the construction or for the ornamentation of which they were intended to be applied. From the artists we have a right to expect that true taste, that scientific knowledge, and those sound principles, too often wanting in the manufactured works. The difficulties to be overcome in the various processes, or the limited resources of the manufacturer, together with the influence of the public taste on the demands of the market, *may* form some excuse for the manufacturer if his efforts are imperfect, or directed to sale rather than to excellence. But the designer has so long exclaimed against the bondage which has obliged him to please the public and the manufacturer at the sacrifice of his own better judgment, that he ought gladly to have seized on the present opportunity to exhibit a faith and practice of his own. Now at least he was at liberty to appeal to the few, and, untrammelled by any conditions, to exhibit his own powers, his own knowledge, taste, and better judgment, to lead

men to the appreciation of the simple and the chaste as the true source of the beautiful. Another reason for commencing with the examination of the works of the artists was, that if the stream was pure at the fountain, the blame would justly lie with those who afterwards defiled it; or, in plain words, if the designer were proved to have set a good example in his works, false taste, where found, might be placed at the door of the manufacturer; while, on the contrary, some allowance might be made for him if the authorized teacher were wanting in taste and true principles.

Before proceeding with the subject, however, it is necessary to arrange, under some general heads, the various works of the designer, and applications of design, which are to form the subject of this Report. The largeness of the field must be an excuse, if many combinations of design and manufacture are entirely overlooked, others very slightly alluded to, and all imperfectly considered. The many thousand specific applications of design, and the large number of classes and sub-classes into which the labours of the designer enter, render it impossible, in the time and space allotted for such a Report, to give more than a general *résumé* of the subject. The attempt, therefore, has rather been to arrive at general principles than to enter upon the examination of individual objects. At the same time, the principles that are found to guide the designer for one fabric are often so self-evidently applicable to others, that, even thus generalized, the Report has reference to numerous manufactures which have not been specially considered, and to many individual cases that do not range exactly under any one of the heads named in it.

The method adopted has been to declare the general principles, as far as they can be arrived at, which ought to govern the design and ornamentation of any fabric, to indicate prevailing errors and false taste, and to allude sparingly to such works of merit as seem wholly or largely composed with good taste and on sound principles.

The proposed classification divides itself under four general heads:—*Decoration of Buildings—Domestic and other Furniture—Domestic Utensils and objects of Personal Use—Garment Fabrics.*

The general heads will be again subdivided as follows:—

1. Decoration of buildings, consisting of—

- 1st. Architectural decoration, painted, &c.
- 2nd. Stone, carved wood, terra cotta, carton-pierre, and other relief decorations.
- 3rd. Stained glass.
- 4th. Inlaid floors, mosaic pavement, inlaid tiles, &c.
- 5th. Paper and other hangings.
- 6th. Metal-work.

2. Domestic and other furniture, including cabinet-work of all kinds, and furniture of all materials.

- 1st. Stoves, grates, fenders, lamps, gas-fittings, and other hardware.
- 2nd. Carpets, portières, table-covers, and floor-cloths.
- 3rd. Curtains and hangings.
- 4th. Tablo-linen.

3. Domestic utensils and objects of personal use—

- 1st. Porcelain, pottery, &c.
- 2nd. Table and ornamental glass.
- 3rd. Works in the precious metals and jewellery, clocks, &c.
- 4th. Bookbinding.

4. Garment fabrics—

- 1st. Woven in patterns of any material, and hand-worked.
- 2nd. Printed " "
- 3rd. Lace.
- 4th. Ribbons.

In reviewing these various classes it may happen that different materials, ornamented by the same means, and applied to the like uses, may be spoken of indifferently; or even varied uses may be comprehended under the same general remarks, where the same principles of ornamentation are strictly applicable, since the object in view is rather to include, and thereby shorten labour, than to maintain the nice distinctions necessary under the several class Reports.

DIV. 1.—*Decoration of Buildings.*

Architectural decoration, painted, &c.

Architectural decoration in carved wood, stone, terra cotta, carton-pierre, gutta percha, &c.

The objects in the Great Exhibition which range under the two first heads of this section belong to almost every known style of ornament, and are so various in their character and uses that it is hardly possible so to arrange them as to bring them under general criticism, or to define any principles which would be universally applicable to their design. They consist, 1st, Of decorative treatments exhibited as efforts of skill. 2ndly, Of restorations of parts of buildings, and of ornamental constructive parts. And, 3rdly, Of works intended to form integral parts of a building, but which are *manufactured* so as to be adventitiously applied. Properly speaking, the design for the decoration of any building, both externally and internally, is the province of its architect, since in this case decoration is essentially a part of architecture. If the principle insisted upon in the prefatory remarks to this Report, that ornament is the decoration of construction, be just, it will be apparent that it is hardly possible to judge of the one without the other. In works wherein the decorator makes his own sham construction in order to ornament it, as well as in those multiplied manufactured "parts" which form the staple *ornament* of a large class of *workmen* in this line, we may admire the skill of the execution, the cleverness of the details, the excellence of the manufacture, or the imitation of early works of acknowledged merit; but to appreciate "decoration" we must view it as a whole in the place for which it was specially designed, and in harmony with the building whose construction it ornaments. Moreover, it must mainly originate in local circumstances, and ought to have an individual significance. Here, however, the moment we enter upon the varied inspection we become sensible how impracticable it is to lay down any

general canon for works which differ almost as widely as the beginning and end of time. In other ages of the world, nations have been fortunate in so adapting design to prevailing wants, and in sympathy with existing feelings, as to produce a national style. But in the present day men no longer attend to such considerations; they are wholly without such guiding principles, and consequently are totally without a characteristic style. They are satisfied with the indiscriminate reproduction of the architecture of Egypt, Greece, and Rome, or of Christendom in any, or all, its marked periods. Originality they have none. One man delights in a Gothic villa; another prefers the style of Italy: even India and China have their advocates, who never consider that climate and use should rule the choice, rather than fantasy and whim, and that there *must* be conditions arising from the present state of society, from fiscal regulations, modern habits, &c., which, duly attended to, would, in addition to utility, be likely to result in novelty and beauty.

It is this merely imitative character of architecture which has so largely contributed to decorative *shams*, to the age of putty, papier maché, and gutta percha. These react upon architecture; and, from the cheapness with which such ornament can be applied and its apparent excellence, the florid and the gaudy take the place of the simple and the true. A popular writer describes the wearer of cheap finery as having his jewellery "a size larger than anybody else;" and so it is with the cheap finery of imitative ornament: it is always "a size larger" than it should be—bolder, coarser, and more impudent than the true thing; it excites our contempt by its flashy tawdriness, so incongruous with the meanness and vulgarity it is intended to adorn.

From this *manufacture of ornament* arises all that mixture of styles, and that incongruity of parts, which, perhaps, is itself "the style" of this characterless age. Through it, also, the plasterer and the paper-hanger too often usurp the place of the architect, to the certain dismissal of the mason and the wood-carver; and ornament, perchance in itself unobjectionable, is sure in such hands to be grossly misapplied.

The "designs" for architectural decorations exhibited are few in number, and are very open to the foregoing criticism.

Those on the foreign side are in the French department: they seem the very vagaries of a fantastic imagination, full of fancy, it must be owned, and skilfully executed, but without the slightest sense of utility or of constructive truth. Everywhere ornament is in excess; the architectural construction obscured and overlaid with figures, fruits, flowers, &c., so that they seem more fitted for the scene of a theatre than for any sober purpose of every-day life. Crowded together in such capricious abundance, the ornament can only be that of those cheap imitative manufactures we have above referred to. The "designs" on the English side consist of a few reproductions and adaptations of early styles, on which invention is as much wanting, as in the others it is in excess. Of the works themselves exhibited in this section, the reasons already given will dispose of a large number, since it is impossible to view them otherwise than as specimens of skilful execution, or the reverse; thus, for example, what can justly be said of the ceiling exhibited by A. MONTANARI of Milan? (Austrian, No. 738). The room which is fitted up for its reception is badly lighted, and otherwise unsuitable, and the reverse of what is requisite for a library, for which the decoration is intended; but that

matters little, since, under the best circumstances, it could be truly appreciated only in connexion with an architectural reality. It may deserve praise for its extremely dexterous and skilful execution; but this is quite a separate thing from exhibiting any just principles on which it has been designed. It may be said, however, that, as a ceiling, the decoration is too heavy, both in form and colour. This, which would be even more apparent in a lighter apartment, is a great error in a ceiling decoration, having the effect of depressing it, and diminishing the height of the room—a fault often seen in the richly gilt and massive ceilings of the continental palaces. It may, indeed, be laid down as a rule, that the decoration of a room should diminish in heaviness, in strength, and in gorgeousness as it passes into the ceiling. Then again, as to the numerous ceiling decorations beneath the galleries on the English side: from the same causes it is only possible to speak of the skill of the decorative workman, since to judge of their local adaptation is out of the question: the light and graceful decorations being necessarily placed at the same height as the heavier and more richly treated ones, and of course their due adaptation judged of equally by that height, although, perhaps, the one may have been designed for a much lower ceiling than the other. The like difficulties, arising from causes before enumerated, prevent the proper consideration of the various specimens of wall-decorations. The principles, however, which are given under the head of Paper-hangings, eminently apply to such works.

The restoration of parts of existing buildings calls for little originality in the designer, since it almost wholly consists in the careful study of the decoration which remains, aided by a knowledge of the traditional ornament of the period. Such are the carefully restored spandril for Hereford Cathedral by N. J. COTTINGHAM (No. 63, Main Avenue West), part of the tomb of Queen Philippa by S. CUNDY (No. 60, Main Avenue West), and the wood-carving for the dining-room at East Sutton Place, designed by C. J. RICHARDSON (Class XXVI., No. 207A). In such works the taste of the designer is shown in excluding the coarser characteristics of the style, and making use of those only which, if less marked, are also less extravagant, adopting its general spirit, rather than copying its individuality. Thus in the sister art, the unskilful portrait-painter seizes on the most salient characteristics of his sitter, and dwells upon all the individual defects of form and feature: the result is a likeness indeed, but a caricature even upon the homely original. The painter more skilled in his art avoids such coarse renderings, and under his hand even the plainest face is refined and generalised. In the same way a style becomes degraded. The decorators who adopt it overlook the spirit of its general idea, and exaggerate its peculiar characteristics, until at length it is likely to become a mere distorted caricature. Thus it was that the Renaissance degenerated into the Tudor, and the ornament of Louis XIV. was further degraded into the rococo and bizarre style which now goes by that name. A work, otherwise of much merit, may serve as a slight illustration of these remarks: it is the decoration, carved in walnut wood, for the end of a room, in the style of Francis I., exhibited by Messrs. HOLLAND and SONS (Class XXVI., No. 161). This skilful work is detracted from, in a degree, by want of due selection: thus the large shell-forms, used in the blocking course above the cornice, are heavy and out of place in such a situation, and should not have been so used, however sanctioned by traditional authority. The ornament of the pilasters also, otherwise well

designed and skilfully executed, ought in wood-carving to have been kept in lower relief, so as to have been within the surface of the pilaster itself instead of projecting beyond, by which it is at once evident that the ornament is applied, and not, as it should be, carved from the solid wood.

Space will not permit, even if it were necessary, to speak of the numerous carved and other works in stone, wood, and marble, for decorative additions to buildings, exhibited in various parts of the Exhibition, since there is little which, from the original or peculiar application of design, calls for especial notice. The errors of such works will often be found to originate in the construction fitted for one material being applied to another, thus, that which ought to have been stone is wrought in wood, or wood treatments are carried out in stone or metal. The costly malachite decoration exhibited in the Russian Court may be noticed as an example of this mistake. Stone doors at all would seem to be an anomaly, but framed after the manner of wood still more so. In addition, the doors, which necessarily produce a sense of extreme weight, are hung to pilasters so narrow as to be quite disproportioned for their support.

It may not be amiss here to advert to the error arising from excess which these works illustrate. Thus, the malachite vases exhibited in this room are improperly supported on malachite pedestals, greatly detracting from the sense of rarity and richness which would result from having only the principal object made of the rare material and its support in a baser one, while all the enrichment which would arise from contrast is lost also, and the eye is fatigued with the quantity and sameness of colours, which would have been refreshed had a marble of some homogeneous colour been used for the bases instead of the malachite.

Ornaments manufactured from plaster materials, such as gutta-percha, putty, carton-pierre, &c., have no doubt a substantial value in the Great Exhibition, commercially considered. As regards design, however, they are but dangerous subsidiaries, often doing greater injury, from the tasteless, misplaced, and false decoration arising from their use, than good, by ministering to decorative purposes. Apart from that monotonous multiplication of the same forms, necessarily resulting from the unvarying productions of the mould and the die, which has been before alluded to, there are other evils sure to accompany *manufactured* decorations such as those now under consideration. The great cheapness of the substitute, compared with the real material, inevitably leads to excess. Such ornament always seems added or applied, stuck on as it were, and can rarely be made to appear as a part of construction; it therefore constantly carries with it a sense of untruth, till the mind and eye, from habit, become satisfied with it, and at the same time deadened to what is really true and good. Moreover, decoration of such materials must necessarily be patchy and incomplete: when the parts to be ornamented are large, this evil is seen in its most exaggerated form; a florid and gaudy centre has perhaps to be united with coarse corners, either by other ornaments or by the repetition of the centre portion, and all sorts of expedients must be resorted to to "bring in" the parts so, as to suit the architectural distribution of the apartment; it can indeed barely be possible that the quantities, or the geometrical arrangement in which the ornament has been originally constructed, will agree with the place to which it has to be adapted, and more or less of make-shift must be the result. One of the most

important works in such materials is the centre compartment of a room in carton-pierre, by V. CRUCHET, which, with all the excellences of the manufacture, exhibits many of its prominent defects, and may serve to illustrate the general faults of such materials. Thus it is decidedly over ornamented, and this is shown not only in the excess of ornament, but in the want of relative scale between the ornament and the constructive forms of the architecture, the former being far too large, as well as too redundant. Scale also seems to have been quite disregarded in the parts themselves, since the fruit and flowers, the birds and game, of one part, are different in size from those of another part. The style, again, is mixed, one part being two centuries earlier than the other. There is, besides, far more pains taken with the exact rendering of fur or a feather, than in perfecting the form of a moulding, or the shape of a panel—the architecture has, in the designer's mind, been subordinate to the ornament, and an ill-formed ellipse, or a coarse and unrefined moulding, appears of less importance to him than the mere imitation of the feathers of his birds, or the fur of the animals of which his ornament consists. Carry this treatment a little further, and it will result in having the game, the fruit, the foliage, and the flowers not only modelled to the exactest imitation, but the skill of the painter called in to add to its naturalism, and the whole painted with the colours of nature; thus decoration will be thought perfect only when it competes with those strange relieved pictures which are exhibited in frames in close juxtaposition with the work in question. Of the artistic and skilful grouping, and of the merit of the modelling of the ornamental portions of this decoration of Cruchet's, there can be no question; but, as has been before said, even these excellences may merge into faults if they are too exclusively directed to mere imitation, and if the design to which they are applied has not the merit of a just perception of use and purpose. One great cause of evil in the use of the materials under consideration consists in the false principle of their application to decorative purposes. It is found, for instance, that peculiar qualities, which are difficult of attainment and an effort of great skill in other materials, can easily be obtained by a new means; instead, therefore, of carefully studying its just adaptation to ornamental production, the effort is only to emulate in excess those peculiar qualities which are trials in the more intractable material. It too often happens, moreover, that the original works imitated were in false taste; and this becomes far more apparent in the copies, since the mind can no longer dwell on them with that admiration which is caused by a sense of difficulties overcome, and which compensated, in some degree, for the absence of good taste in the works they emulate: for instance, the exact imitation in wood or stone carving of the individual details rather than of the general character of objects used as ornament, extreme relief, under-cutting, lightness, thinness, and picturesqueness of the forms of foliage and flowers, whereby their natural growth is attempted in carving rather than a due ornamental disposition of their forms—all tending to excess and exaggeration, and to be avoided rather than copied. Another source of error consists in rendering what should be true constructive forms into mere ornament; thus pilasters, and even columns, consoles and trusses intended to support weight, are manufactured in these imitative materials, and introduced only to decorate, until all sense of utility and construction is lost, and ornament becomes the principal instead of the subordinate. Such materials,

however, are capable, under proper control, of useful application to ornamental purposes, both from their ready adaptability to various surfaces and forms, and from the cleanness and sharpness with which they can be moulded, as is seen in the works of the GUTTA PERCHA COMPANY, those of JACKSON and SON, of BIELEFIELD and Co., and of others, as well as in the work above referred to. It is most desirable, therefore, that the errors to which a false application leads should be carefully pointed out, so as to bring these materials as much as possible within their duly limited use.

Some of the above criticisms will apply to terra cotta also; but this material, partaking largely of reality and allowing of being perfected by the hand after the first mechanical process of moulding, would, under fitting regulation, become a most useful and durable agent of ornamental decoration.

STAINED GLASS DECORATION.

The art of painting on glass, or glass-staining, has come down to us so intimately mixed up with the ecclesiastical architecture of the middle ages, that it is almost impossible to view the one unconnected with the other. It was born of the same parent (the Church), and from the first both were equally devoted to her service. Of Gothic architecture, and of it almost exclusively, stained glass has always formed a necessary decoration: it follows, therefore, that its ornamentation is almost wholly traditional, and has relation to the various periods of the Gothic architecture which it accompanies.

Not that it is necessary, or even desirable, that the epochs of the two arts should, in their revival, continue to correspond; but the periods of each, whether simultaneous or otherwise, when utility and beauty were most fully understood and attained, should be diligently studied in search of the principles that guided the artists of those times, and that which is best should be chosen, irrespective of mere correspondence of epoch or antiquarian authority. Moreover the errors, which the ignorance of an early age evidently occasioned, should be carefully separated from the truths, and not considered as of necessity a part of the *style* of the period in which they are found,—such, more particularly, as bad drawing and want of knowledge of the human figure; at the same time, that simplicity of treatment which is so highly characteristic of early works, which overlooks all details, and renders a composition from the Scriptures, or a single figure, more as a symbol than as a picture, should, if it is found to be a principle of excellence, be carefully retained.

As is the case with all other manufactures and fabrics, so it is with painted glass: the question of utility, rightly considered, will lead us to some knowledge of what is most suitable in its treatment as a decoration. Glass was introduced into the numerous windows of Gothic architecture to temper the glare of light, and to serve in a manner as a blind by preventing the direct entrance of the sun's rays, and also to shed that solemn religious light which so well accords with the sacred mysteries of religious worship. The mosaic glass of the early artists of the 12th and 13th centuries was most admirably adapted for this purpose: being composed of many small pieces of full and pure tints, with little white glass, the rays of the sun were broken and dispersed, the light lowered in brilliancy, and the whole effect was homogeneous, rich, and solemn, sufficient light being still permitted to enter for the performance of the religious services of the church. Even compositions of

figures were subject to the principle that regulated the whole: the figures were small, so that the colour of their draperies and accessories might be broken up into many pieces to give the same equal distribution as in the ornamental parts of the window. It would seem, indeed, that the painter did not intend to simulate a picture, but rather to symbolize a sacred text or thought, and the figures, therefore, were not so much pictorially arranged, as composed with extreme monumental simplicity; thus, they not only partook of the general effect of the window, but the attention of the spectator, impressed with the solemn yet beautiful light, was, at the same time, filled with the holy thought conveyed by the subject, without being distracted by too great an individuality of parts. The representation of shadow, strictly speaking, was not admissible, the composition consisting only of flat forms of the greatest simplicity. For this, even, there would seem to be just reasons: the light being transmitted through the glass to the spectator within, shadow would appear to be anomalous and out of place, since the illumination in such a case emanates from the figures themselves; moreover the simplicity of the shadowless forms was better suited to impress the eye from the distance at which such works must necessarily be viewed. Such would seem to be some of the principles which ought to regulate, and which in the best times did regulate, the design for painted glass. An entirely different view of the art has however sprung up with its revival, and has obtained many advocates, especially on the Continent. It has been felt how greatly art has advanced in the hands of the historical painter since the times spoken of: that the principles of composition, of foreshortening, of perspective, of light and dark, and of the arrangement of colour, then quite unknown, have been discovered and developed; that drawing, then in its infancy and unaided by knowledge, has now arrived at maturity; and that science has given us power over the materials which they possessed not, and enabled us to conquer difficulties which they considered insuperable; and it is asked why the painter on glass should not avail himself of all these advantages, to perfect his art and render it as pictorial as the works of his brethren. By artists who entertain these views, the surface of the window is treated almost as a canvas would be: the forms of the figures are large, even as the size of life: the draperies are massive, and the heads painted with great imitative skill and completeness. *Clair-obscur* and perspective are studied, and foreshortening and pictorial attitudes in the figures supply the place of the monumental and statuesque delineations of the earlier artists; in fact everything is done to treat the window as a picture.

To the advocates of this style it may be objected, that a picture is specially intended to address itself to the mind and imagination only, while painted glass has a reference to use also; and that, apart from this consideration, each and every art has its own mode of rendering nature—not necessarily implying *deceptive* or complete imitation; thus, for instance, the art of the sculptor is a generalized imitation of form, and even the painter of high art does not desire to make his picture deceptively imitative, but listens with impatience to the remarks of the ignorant, who are apt to praise his work for this quality above others proper to it which they do not understand. An outline of Flaxman's fills the mind with a perfect sense of beauty and with the fulness of a poetical idea; surely, then, the flat and simple treatment of subjects in glass-painting, if such treatment is requisite for its utility and most in consonance with its other

qualities, may be found sufficient to give as complete an expression to the pictorial rendering of a scripture truth as the material and situation of such works require.

Among the works in the Great Exhibition, both manners are adequately represented. Thus the pictorial method is well illustrated in the ably executed window of MARECHAL and GUYON (No. 329, France), of "St. Charles administering the Communion to the Plague-stricken." Here the forms are simple and broad, the masses of colour large, and the effect thoroughly that of a transparent picture, with all its details well drawn, carefully painted, and rounded by shadow; while the composition is arranged with regard to the laws of *clair-obscur*. But instead of that general and harmonious effect of sobered light, which is so desirable in stained glass for the windows of a religious edifice, the effect is painful to the eye from its extreme brightness, and the window would irresistibly obtrude itself upon the attention of the spectator, and rather distract his thoughts than induce that solemn repose of mind which is so consistent with the place. The great Dante Window, by G. BERTINI, of Milan (Main Avenue, West), is another example of this method. It is a very skilful work so far as regards the manipulative means, well drawn and painted, and exhausting the resources of the material. As a window, however, it is exceedingly sombre, and would far too much reduce the light in any building to which it might be applied. The colouring is cool and pleasant, in which respect it is better than Marechal's window, which is too hot. It is to be observed also that the construction of the window is greatly in the way in these pictorial treatments, and that a false construction has been adopted in both these works, in the latter, indeed, without the slightest architectural fitness. The other method of treatment has also many representatives, some of much merit. Among these the "History of Sampson," by A. GERENTE, a work of great purity as to traditional style, although in adopting the just principles of design the faults of the age have been adopted also, which must be objected to. The texture of colour in the glass, if such a term may be used, has been obtained with great skill by this artist. LUSSON's window, competitive for the St. Chapelle, is also a good example of this manner—dust and time, and the corrosion of the glass, have, however, been too much imitated, necessarily perhaps in a restoration, but rather interfering with this otherwise meritorious work. HOLLAND, of Warwick, "Life of Christ" (No. 407, Class XXVI.), I. A. GIBBS (North-east Gallery, Class XXIV.), J. G. HOWE (Class XXVI.), and Messrs. CHANCE & Co., have specimens of glass of this style of various merit.

It would seem to be a great fault in glass to have a prevailing tint or hue, since by a truly harmonious composition of colour such a result would be avoided. This defect is visible in the glass exhibited in the North-east Gallery, in some of which a prevailing green, in others a yellow hue, is observable. This is often the case also with the modern French glass, as seen in some of the restored churches of Paris, more especially the pictorial glass, in which a hot red hue is often present, sometimes to a painful extent: the flesh especially is hot, and dirty in the shadows. It is to be doubted, indeed, if, with all our knowledge of the harmony and complements of colours, we have yet attained to the principles by which the old glass-painters arranged their agreeable combinations. Whatever was the method, the effect was coolness of general tone: the flesh had little local colour, the prevailing tints of the draperies and accessories were blue, cool green, and amethyst, and even the red was cool, inclining to crimson. The hot browns of

the flesh in the modern glass, together with its opacity, are often very disagreeable, and the effect of scarlet instead of crimson may be seen in the work of MARECHAL, before spoken of, where the robe of the cardinal who is administering the sacrament (a large mass) is of that hue, and greatly tends to increase the hot and glaring effect of the whole. In the Parisian churches, where ancient and modern glass are both to be found, even when the former is not of the best period, as in St. Germain l'Auxerrois, for instance, it is quite refreshing to turn the eye from the modern to the old glass, showing how far more harmonious the one is than the other.

In estimating the excellences of the one or the other methods of glass-painting which have been spoken of, the superior durability of the earlier method is to be noticed; also the much smaller liability to accidents from the diminished size of the pane, and the much less damage if a fracture do take place: an unlucky blow may immediately destroy the finest portion of a pictorial window, while it could do but small injury to a work on the older principle. These are minor merits, but to them may be added the greatly increased brilliancy of colour occasioned by the more frequent interposition of the dark line of the *leading*, and the lustre occasioned by the slight change of plane, in the smaller pieces of the early method bringing out thereby the richness of the glass, as the varied facets of the lapidary do of the precious stone. Indeed it may be doubted if the subject of *leading* has had all the attention it so well deserves. The skilful manner in which this was executed in the early works is apparent from the preservation of the windows, unharmed by the storms and winds of centuries. It is certain that a varied surface was at times adopted in such works, for resisting, as has been supposed, the pressure of the winds: thus at Haddon Hall, in the long gallery, glazed in the reign of Elizabeth, each window is waved inwards and outwards over the whole surface, and each piece of glass cut to adapt it to this treatment: the result has been great durability, even although the lead itself is extremely narrow. These are, it is true, windows of uncoloured glass; but it may probably point to some such method being used in decorated windows, to enhance their brilliancy and increase their effect.

INLAID FLOORS, MOSAIC PAVEMENTS, INLAID TILES, &c.

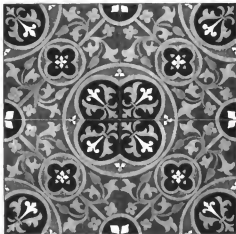
The ornament of this section seems the soundest and most satisfactory in the Exhibition—the most free from false principles, the most thoroughly amenable to true. Although this no doubt partly arises from the conditions of the manufacture, it is, in a degree, to be attributed to other causes. The modern introduction of such works in England was at a fortunate time, when the attention of the ecclesiologists and of able artists was called to the revival of mediæval art, and to the study of the best works of Greece and Italy. The designer, therefore, started upon just principles, and continues to adhere to them, even repudiating some of what must be considered errors in the ancient works which have been handed down to us, such as those arrangements of light and dark inlays, giving the appearance of relief, which are found occasionally even in the best ancient examples. The “designs” exhibited are almost wholly on the English side. Apart from those in conjunction with manufactured specimens, Mr. Digby Wyatt’s are the most important: they are varied and fanciful, thoroughly flat in treatment, and consisting mostly of combinations of simple geometrical forms, although there are some of Italian con-

ventionalised ornament. They evidence the careful examination and study which the artist has given to the best antique and mediæval treatments of mosaic. Mr. MINTON, of Stoke-upon-Trent, makes the most important exhibition of such works from designs of Pugin, Gruner, Wyatt, &c., together with some copies of fine mediæval examples and ancient works of great merit.

The illustration No. 1 is of an enamelled wall-tile, imitated from one found at Salisbury, and is given here to show the mode in which flowers were used as ornament in such works by the mediæval artists. The flower is displayed perfectly flat, in one colour, and arranged geometrically.



No. 2 is given as a more intricate treatment on the same sound principles, and is from a design by Mr. Pugin.



No. 3 is an intaglio and enamelled tile of a Moorish pattern, for covering the surface of a wall with an ornamental *texture*, and with a broken harmonious richness of colour, in very durable materials, for which purpose it is admirably adapted. This manufacturer exhibits also many novel and praiseworthy works in burnt and coloured clay to facilitate the application of design and colour to the exterior of buildings. Among others, a species of Majolica ware, with ornament in relief, coloured

with delicate tints, intended to be introduced into friezes, string-courses, panels, &c. and other combinations of the art of the designer with the skill of the tile-maker and the potter, which will enable the architect to break the monotonous surface of brick buildings, and introduce ornamental forms and colour without the necessity of resorting to plaster and stucco, so long the wretched resource for such purposes,



From the geological position of London, bricks must always be the prevailing material for building purposes: such means, therefore, for the safe introduction of colour and ornament, are especially desirable, and should be carefully studied, that the most judicious and sound principles of ornamentation may be adopted in these newly-revived materials. It is curious to see how instantly the removal of the excise-duty on bricks has been followed by the infusion of a new life into the manufacture, both as to novel forms and the application of coloured ornament to their surface; it must be remarked, however, that the ornament of each separate brick should be perfect in itself as well as perfect in combinations, a circumstance which has not been attended to in the glazed and coloured bricks exhibited by Mr. Minton.

From the general use of carpets, considered, as they are, as a necessary comfort in this country, inlaid floors are far less used here than on the Continent, and it is on the foreign side, therefore, that the best design applied to such works must be sought. The principle of ornamentation, of course, is the same as that for mosaics and other inlays; care, however, should be taken to select wood without a strongly marked form in its grain, since this is likely to interfere with the pattern of the inlay in general; also right-lined figures are preferable to curved ones, from there being less need of crossing the grain of the wood in cutting.

Many skilful and ingenious combinations of geometrical forms are seen in the works of this kind in Belgium, Austria, Russia, and France; among others, the flooring of the bed-chamber in the Austrian room, of which the border, consisting of violet ebony and mahogany banded with maple-wood, is simple and pleasing in effect; and a floor by DE KEYN and Co. (No. 434, Belgium), which has much merit in its design: nor should mention be omitted of the very clever inlays for floors and furniture of MARCELIN (No. 606, France), some of which are of the most intricate geometrical character, excellently executed, for borders, panels, frets, &c. Being limited by true principles, these manufactures show less that is meretricious than do most other sections of the Exhibition, and far less tendency to that over ornamentation which elsewhere predominates.

PAPER AND OTHER HANGINGS.

If the use of such materials is borne in mind, the proper decoration for them will at once be evident, since this ought to bear the same relation to the objects in the room that a background does to a picture. In art, a background, if well designed, has its own distinctive features, yet these are to be so far suppressed and subdued as not to invite especial attention, while as a whole it ought to be entirely subservient to supporting and enhancing the principal figures—the subject of the picture. The decoration of a wall, if designed on good principles, has a like office: it is a background to the furniture, the objects of art, and the occupants of the apartment. It may enrich the general effect, and add to magnificence, or be made to lighten or deepen the character of the chamber: it may appear to temper the heat of summer, or to give a sense of warmth and comfort to the winter: it may have the effect of increasing the size of a saloon, or of closing-in the walls of a library or study: all which, by a due adaptation of colour, can be easily accomplished. But, like the background to which it has been compared, although its ornament may have a distinctive character for any of these purposes, it must be subdued, and uncontrasted in light and shade; strictly speaking, it should be flat and conventionalized, and lines or forms harsh or cutting on the ground as far as possible avoided, except where necessary to give expression to the ornamentation. Imitative treatments are objectionable on principle, both as intruding on the sense of flatness, and as being too *attractive* in their details and colour to be sufficiently retiring and unobtrusive. Some of the best examples, as well of paper as of silk, velvet, and other hangings, are treatments of *texture* in a self-colour; as of flock on plain or satined ground in paper, of tabby and satin in silk hangings, of stamped forms or cutting in velvet, or the same contrast of pattern with the ground in various mixed stuffs. By these means the ornament is necessarily flat, and does not disturb the general effect. With the slightest attention to the choice of form it can hardly be in bad taste, whilst great elegance and beauty often arise from such treatments. Next to these, graduated tints of the same colour produce a safe and quiet ornamentation for such fabrics; or gold upon a coloured ground, where the gold is sparingly distributed and the colour not too strongly contrasted, since in all cases a general *tone* of surface is to be sought for rather than pronounced individual forms. Further richness may be obtained by the judicious use of two or more colours, either, according to the ancient method of harmony, separated from each other by bands of black, white, or gold, or contrasted and enhanced by their complementaries, and enriched by flock in either case, in the latter by gold. But it is everywhere apparent that the combination of many colours, though it may increase expense from the number of blocks, is far from producing richness in the same degree, while it has often quite the contrary effect, and results only in poverty and meanness. It is necessary, however, to advert to a perfectly different treatment of these materials quite at variance with these rules, and bound by no such principles, by which paper-hanging becomes a pseudo-decoration, the wall being divided into compartments often irrespective of architectural construction, and pilasters, friezes, and mouldings imitated in false relief on its surface, with compositions of pictures, statues, hangings, flowers, fruits, &c., skilfully designed and well drawn, and, it may be, often most ably blocked for the purpose of printing; it is, however, at best but a sham decoration, amenable to no laws, necessarily false in light and shade, often constructively inap-

plicable, and always impertinent and obtrusive, and should be left to those who, desiring display, are too much wanting in taste to be annoyed at its untruth and extravagance. It perhaps is not quite out of place in the saloon of a theatre, in cafés, or taverns, but ought to be confined to such localities, and only used there until the general taste is so far instructed that the public will no longer tolerate gaudy shams and false magnificence.

The same laws which ought to govern design for paper-hangings would, therefore, appear proper to regulate hangings of other fabrics, tapestries, &c. Although far from looking at ornament in that exclusive spirit which would reject what is beautiful when it does not square with the requisitions of a theory, it must be obvious that pictorial and picturesque treatments for such fabrics are wrong whenever they intrude on the domain of another art. Thus, figures, landscapes, fruits, and flowers, when rendered as they would be in works of fine art, are almost of necessity inferior to the pictures they imitate, even when they are as skilfully and wonderfully wrought as in the works exhibited by the national establishment of the Gobelins, where every effort of skill and science has been most successfully used for their manufacture and embellishment. Indeed, it is a matter of doubt whether custom, and the authority of great names and of past times, are not the causes of the continued admiration of such decorations, which perhaps we rather persuade ourselves we like than are fully satisfied with.

With very few exceptions, the exhibited "designs" for hangings appear to be totally unregulated by any perception of rules for their ornamentation, and, even when they happen to be on just principles, would seem to be so by chance rather than by choice. They are mostly florid and gaudy compositions, consisting of architectural ornament in relief, with imitative flowers and foliage. In some of the cleverest designs the flowers and foliage are perspective rendered with the full force of their natural colours, and light and shade; moreover, they are often three or four times as large as nature, whereby the size of a room would be apparently diminished. The French are the largest contributors, and their designs are characterised by the foregoing remarks; they are, however, exceedingly skilful in their details, the flowers and foliage well understood and artistically arranged, and *blocked* with great skill and knowledge; but as to style they are most objectionable, and lead to the worst results, especially in the common manufacture of such goods.

The pupils of the Government schools exhibit, among other designs, some meritorious ones for paper-hanging. It is evident that their general taste is controlled and regulated by the knowledge of the just principles which should govern the ornamentation of these as well as of the other manufactures for which they have laboured. Being students' works they can hardly be expected to abound in fancy or invention, and it is sufficient to find that they are well drawn, skilfully executed, and amenable to just laws of composition. In examining the design applied to the manufactures themselves, the same want of just principles is observable as in the works of the designers. It is true that manufacturers must produce works in every style, as well to suit those who are unable to appreciate what is good, as those of more informed taste; but it might be expected in an Exhibition of this nature—an Exhibition of skilled labour and of the strife after excellence—that excellence would be the rule, and error the exception, whereas the reverse is generally the case. Were it a part of the duty of the Reporter to enter into the clever

and skilful execution, the treatment of the pigments, the excellent blocking, or the general manufacture of such fabrics, there would be much to say of the foreign exhibitors, DELICOURT (No. 1715, France) and ZUBER (No. 1536, France), SPOERLIN and ZIMMERMANN (No. 651, Austria) of Vienna, and others, as well as of TOWNSEND and PARKER, WOLLAMS, and others on the English side; but in the *design* of their papers there is little to commend, and works of passable excellence in this respect are the rare exceptions to their collections. One or two designs, delicate in colour and on just principles, are exhibited by FETTER and RAHN (No. 262) in the Russian Court, mixed up, however, with others in the usual false taste; and passable designs on the principles herein advocated are to be found occasionally in other collections, evidently resulting from a happy accident rather than a well-regulated choice. The English and foreign manufacturers seem equally at sea: with the exception of a few simple diapers, which hardly call for individual remark, the works of the best Exhibitors on the English side, while they are very heterogeneous, are less original and equally wanting in a sound knowledge of what is properly characteristic for such works.

There are, however, honourable exceptions to these remarks: after passing in review the paper-hangings of the various countries, it is quite refreshing to meet the clever wax-cloth decorations exhibited by M. E. T. VIVET (France, No. 734). The ornament of these works is without shadow or imitated relief, thoroughly flat in its forms, which consist of graceful and flowing lines; the colour is equal in scale, without harsh contrasts, and of semi-neutral hues. There is no attempt at shams, to imitate marble, or oak, or any carving; nor to panel it, which is left to arise out of the architectural forms; but a series of graceful lines, with a quiet uniformity of tint, satisfy the mind and give repose to the eye. Moreover, having laid down certain principles on which manufactures and fabrics should be designed with a view to the true use of materials, and to avoid unnecessary display, by the proper application of ornament, it is impossible to refrain from speaking in high terms of the works contained in the Mediaeval Court, manufactured by Messrs. MYERS, MINTON, CRACE, and HARDMAN (Class XXVI., No. 529), under the direction and from the designs of Mr. W. Pugin. Some may object to the exclusiveness of the style, and to its too purely ecclesiastical and traditional character, even in domestic works; but for just principles of decoration, for beautiful details, for correct use of materials, and for excellent workmanship, the general collection is unique. Thus, in the paper-hangings, for instance, there is no throwing away of many blocks to obtain richness, when one or two can be made sufficient: there is a perfect flatness and a subdued harmony of colour in all such works; and if Tudor roses and heraldic lions are sometimes too pronounced, and there is occasionally a little excess of ornament, richness is generally obtained at the smallest sacrifice of means, and without any sacrifice of truth. The same may be said of the hangings in silk and wool, and the carpets in this collection, the designs for which are highly commendable for their strict adherence to true principles.

Without having any sympathy with the *application* of decorative paper-hangings, such as those of Delicourt and others, it would be unjust to pass them without praising the artist-like design, the powerful execution, and the great ability displayed in these works by the French artists. In that by DELICOURT, besides the skilfully-blocked hunting subject of the centre panel, the details of the

parts, such as the grouping of the game and arms on the pilasters, and of the birds and children on the frieze, have great merit, apart from the skill with which the whole has been adapted for block-printing. The same may be said of the work exhibited by MADER BROTHERS, which is an extremely fanciful and clever piece of decoration, and in as good taste as such false treatments can well be. The frieze of children is well designed and ably managed for printing; the landscape of ZURBAN has also much merit in its details; and the work of GENOUX has parts worthy of examination.

These decorations bear out the remarks at the opening of this Report as to the superiority of the French working artists. The men who carry out the designer's inventions in France, must themselves have a large share of skill and art-knowledge to be able to prepare the design for the manufacturer's processes with the ability so evident in the works just remarked upon.

Among the English contributions in paper-hanging are specimens of the lately-introduced processes of printing by such machinery as is used for cotton goods, and of applying many colours from one block. These are likely to create a style of ornamentation for such fabrics of the most depraved kind. The largeness and flatness of details attainable by block-printing are less suited to cylinder printing than more minute details, and the new processes offer ready means of applying several colours at a small expense; the reverse of what has hitherto been the case; hence the effort has been to impress as many tints as possible on paper, and excellence is reckoned rather by the number of colours than any other quality. Thus we are informed that works are printed in "sixteen colours," in "fourteen colours," &c., the works themselves evidencing the absence of all knowledge of the effective arrangement of colour; while violent, crude, and harsh tints are too often used to give greater impression of this *excellence*! and the result is littleness and extreme meanness; in fact, such papers are, in point of design, much inferior to those printed in two colours by the same machinery. Well-considered design, thoroughly adapted for this process, would enable the manufacturer to unite good taste with extreme cheapness; whereas the only present result is by increased labour to detract from the beauty of the ornamentation. It is impossible, however, not to remark the skilful printing exhibited by our English manufacturers.

EXTERIOR AND OTHER METAL WORK.

The works, in metal, of this section which are exhibited, consist chiefly of constructions for fountains, and of ornamental iron-work in gates and balconies, and for door-panels, lamp-pillars, flower-vases, and tazzae. The best of the metal fountains are so nearly within the limits of fine art, that their consideration may be left to that class. It is, however, to be remarked that the zinc castings of the French and German founders show how suitable that metal is, as a means of spreading the best art, for any exterior purpose, in a cheap and durable material, as well as of embellishing public works of the above-named character, at comparatively small cost, without the evils arising from oxidation when iron is used. Notwithstanding all that has been said about the incongruity of our climate with public fountains, there are undoubtedly long periods of the year, and those when London is most crowded as well with her own resident population as with visitors, when such works are not only extremely ornamental, but

when an exhausting atmosphere would render them of real utility and refreshment. The motion of water, at any season, has a great charm, and is peculiar in its power of giving pleasure even in the simplest jet or fall, agreeably and artistically disposed; and ornamental arrangements for its full display would not only be picturesque additions to our city, which offers so many localities for their adoption, but would afford to our artists motives for combinations of figures with ornamental decoration, and thus, perhaps, be a means of once more uniting fine and ornamental art, which, sadly to the deterioration of public taste, have for so long a time been almost wholly separated. It may be doubted if the public would willingly part with even the tame and commonplace repetitions which adorn Trafalgar Square; and those who have had the pleasure of enjoying the fountains of Italy and France will be quite prepared to judge of the effect which more skilfully-designed structures would have on the public mind here.

Such works in iron as gates, balconies, and panels, are, for the greater part, in cast metal, which of late years, from its capability of cheap ornamentation, has almost wholly superseded wrought iron for these purposes. Where the object is intended to be fixed and immovable, as a balcony or panel, cast work is not unsuitable, and is capable of much beauty of ornamental design, as we see in panels exhibited by MUEHL, WAHL, and Co. (France, 934). In these the ornament adds to the strength by its numerous articulations, while it is light and elegant in its forms. Works of this kind are generally of a size to admit of casting in one piece, ensuring thereby strength and lightness by continuity of parts. But in cast-iron constructions intended to be moveable, as in the various kinds of gates, a very different character of design is necessary; in the first place, because entire casting is not always possible, both from the difficulty of running the metal into the numerous ramifications of the ornament in works of such increased size, and from the fear of warping in the cooling, as well as the great expense of a mould, which is saved by forming the ornament of a series of parts. This leads to the necessity of framing the work in wrought, and applying the ornamental details in cast iron; but hence results this evil, that the ornament has little constructive use, and is apt to look rather an addition than an integral part of the work. In the park-gates exhibited at the south end of the Transept, great pains have been taken to get over this difficulty, but not with success, since the two metals are joined in parts wholly at variance with constructive strength; in fact, it is a wrought-iron design, partly executed in cast metal. Moreover, cast-iron ornament is necessarily far heavier than that of wrought iron, from the extreme brittleness of the cast metal: this heaviness is sadly opposed to its real constructive strength in the manner usually adopted for putting together. The ornamental parts of such structures being riveted or screwed into the framing, there are smaller points of attachment than in wrought iron; the parts bed themselves less perfectly at the junction, since it is impossible to assist this union with the hammer, and the metal has small tenacity, and easily breaks with any sudden jar: thus there is much less power to support, while there is of necessity much greater weight to bear; and without very careful and well-considered design, making the ornament as far as possible a brace to the work, the whole is apt to be an insecure aggregation of parts, without constructive unity or truth. In large works, cast in one piece, such difficulties are readily surmounted, as weight can then be made to add strength, instead of detracting

from it. In the old hammer-wrought gates, the ornament was not only a truly integral part of the work, but most materially assisted in the general support. Thus great lightness and elegance were, in this case, consistent with great strength, since the ornamental details supplied a means, not only of tying and bracing the work together, but of preventing the front of the gate from drooping with its own weight, to the great hindrance of its use, and which in cast works of this kind has often to be assisted by the use of friction-rollers—a make-shift that the older workmen would have despised. When, therefore, we consider the varied beauty of which wrought iron is capable, its far greater durability, its tenacity and power of resisting accidents, the individuality of design which arises from its being wrought by the hand instead of cast in a mould (thereby leaving the fancy and the feeling of the workman untrammelled), it seems not too much to say that it is to be hoped the use of the wrought metal will again prevail over that of cast for such purposes.

The gates and pilasters exhibited by the COALBROOKDALE COMPANY, at the north end of the Transept, from designs by Charles Crookes, are an excellent specimen of casting, being wholly of cast iron, each gate in one piece. Much of the false construction alluded to has consequently been avoided, and many of the difficulties overcome. The design of the gates, however, partakes too much of that adopted in wrought constructions, especially in carrying up the form of the centre, at the top, into florid ornamentation, which tends in this weightier metal to sway down the gate, without any compensating beauty or usefulness. The introduction of a heavy panel of ornament below is also rather commonplace, and due regard seems hardly to have been had to the *whole* surface in designing the ornamentation. The pilasters have more originality: the small twisted bars surrounding the centre columns give a lightness, compared with the strength obtained, which adds to the elegance: the striking-plates of the hand-gates, however, should have been ornamentally constructed or banded in with the pilasters in the centre, to increase the strength and resist the jar of the closing. The other great work in metal by this Company is an ornamental dome of cast iron (Main Avenue West, No. 83). This is a work of much pretension, designed in the natural style, the pilasters representing oak-stems, ornamented with leaves and acorns, and with the intervening branches twisted into an ornamental form: this treatment is mixed with some conventional ornament, here and there, as it were, indiscriminately introduced into the pilasters, having a very patchy effect. The pilasters, also, arising as they do from a single stem, and widening above their base, have an unsteady and insecure appearance, which might easily have been avoided. The great fault, however, is in the setting on of the dome, which from the outside seems to have no constructive connexion with the pilasters, since in it the rusticated treatment is abandoned, and it seems dropped in among the branches, without any proper support. The work, nevertheless, has a certain impressiveness from its size, and its general proportions are well chosen.

There are in various parts of the Exhibition, garden-seats and chairs in cast metal, which are principally to be noticed from the great want of due consideration of the material evidenced in their design: thus sometimes they are ornamentally constructed of branches and foliage naturally imitated, or of branches alone; while, in others, carved and flowing lines are given to the back,

arms, and legs of the seat, which add nothing to the comfort of their use, and sadly detract from the form properly belonging to such works in cast metal, which should be right-lined, and have a geometric character both of ornamentation and construction. It must be confessed, indeed, that the tendency to consider the ornament before either the requirement of the material, or the use to which the work is to be applied, is hut too evident in many of the works in metal in this class. Thus, two large lamp-pillars, designed by an architect, and exhibited in the Austrian department, have as much iron in their overcharged bases as would fonn three pillars, each capable of sustaining the taper upper shaft of the same design. The application of metal to the construction of the building is, on the other hand, an excellent example of just use, construction having had the first consideration, and ornament being entirely subservient; a due amount of elegance has nevertheless resulted from its simplicity and from the true principles on which it has been designed.

Div. 2.—*Domestic and other Furniture.*

A very large and important section of the Exhibition is comprised under the head of furniture and upholstery; and such works claim especial attention in this Report both as to their general design and their ornamentation. Almost every nation contributing to the Exhibition has sent to us its share of furniture, so that here, it might fairly be supposed, we should be able to study the conveniences for living which each country possesses, and their various contrivances for ease and rest.

The English nation, more especially, having that peculiar word *comfort* in its language, might be expected to exhibit how that sense of comfort is adequately provided for; and since, as a nation, we have a reputation for what is solid and substantial, that our furniture at least, so mixed up as it necessarily is with our daily life, with our home habits and with our national mode of living, would, both as to design and ornament, be solid, substantial, sensible, and useful. Our continental neighbours, on the contrary, living as they do more abroad than the English, and being usually presumed to delight in the gay and the ornamental, would be likely to display more fanciful, showy, and decorative works in this Class. In other manufactures, plain and useful fabrics are exhibited even when they have no pretensions to *ornamental* design; it seems therefore rather unfortunate that in the furniture on both sides of the Building, hut more especially on the British, the ornamental so largely prevails to the exclusion of the useful, and that tables, chairs, and beds, fitted for convenience, rest, and repose, have been made to give place to what are presumed to deserve the name of objects of art.

English furniture has, until lately, enjoyed a reputation for its excellence of make and thorough usefulness, and manufacturers were wont to rest their credit on good materials and excellent workmanship. In such furniture the doors fitted with the nicest accuracy, the drawers moved with perfect smoothness, and the wood was so well seasoned that a faulty panel or shrunken joint was out of the question: it descended as a possession from father to son, seeming the better for its very age, and, as is fancied of old pictures, gaining richness even from time. But these sensible qualities, in which we undoubtedly used to excel, have on this occasion been less regarded by our manufacturers than decoration and display, and

they have mostly selected furniture of a class allowing the largest application of ornament, as sideboards, cabinets, bookcases, and works of the like kind, on which to exercise their skill, too often neglecting their own peculiar strength: to rush into competition with their foreign rivals, without the skilled art-workman to execute, or the taste to design, which they possess. Nor is the foreign department wholly free from this misdirected effort to excel, which has resulted in many instances in over-ornamentation; thus, there are chairs so decorated that rest is impossible, cabinets and bookcases which take up much room and hold little, and beds so monumental that they remind us rather of the last sleep than of a couch fitted for our nightly repose.

In endeavouring to lay down principles which may serve as general rules for the designer, it will without difficulty be conceded that, in every kind of furniture having a specific purpose, the first consideration of the designer should be *perfect adaptation to intended use*; this may appear so obvious a truism as to want no enforcement, but a walk through the Exhibition will speedily undeceive us, for there we see a multitude of objects offending against this rule: in some of these use is almost entirely overlooked, or has been evidently quite a secondary consideration, whilst in others it partially gives way either to effect or ornament. Thus in the English department a table of costly manufacture has ornament in solid relief on its upper surface, and many of the grates evidently require a glass-case, since fire and smoke would be the worst enemies to such polished marvels. Nor are these faults peculiar to England; on the foreign side may be seen a piano-forte, surrounded by bristling bullrushes, which must always be catching in the dresses of those who approach it, and with hardly a right line in any part of it; and chairs so heavy that they must be fixtures instead of moveables; while of minor incongruities, the instances are too numerous to specify. Manufacturers should also aim at obtaining the greatest amount of convenience and accommodation in the least space, in order that the furniture may be as suitable as possible to the size and uses of the apartment in which it is placed.

Another consideration to be attended to is stability of construction, *apparent* as well as *real*; the first being necessary to satisfy the eye, the last being indispensable to excellence and durability. Thus the legs of articles of furniture, designed in the style of Louis XV., are often broken in the centre across the grain of the wood, or having their base of support far within the perpendicular line of the bearing; a fault which though not actually rendering them unstable, yet offends the eye as much as if they were really insecure.

The constructive forms, moreover, should not be obscured by the ornament, but rather brought out by it; nor should all portions be equally decorated, but only such parts as friezes, pilasters, capitals, pillars, or panels; herein simplicity is the safest guide to beauty. Over-enrichment, indeed, destroys itself, and it would not be difficult to point out works of the greatest pretension and the most costly workmanship, which are completely spoilt by this fault. Cabinets entirely covered with carving, the very stiles and rails being as decorated as the panels and pilasters: metal chandeliers, with leaves and flowers in as great profusion as in nature: papier maché hidden under a surface of pearl and gold. So extremely prevalent, indeed, is this error, that it may be said to be the ruling vice of the Exhibition. It should be remembered that contrast is one of the first elements of pleasure, and

that *repose* is one of the most valued excellences of art ; thus simplicity serves as the background to ornament, as the setting to the gem, or the foil that enhances the beauty of the jewel ; and the good artist is as much shown by sparing his labour as the bad one by over-enrichment.

It results from the above rule that ornament should arise out of construction ; the work, abstractedly, should be constructed, and then decorated ; not that it is meant that the ornament should be *applied* to the object, but (as in wood for instance) carved from it ; thus the leg formed for support, the pilaster or column for bearing, may be lightened and enriched by cutting away from the block or slab, not by adding to it. In his natural state man is a true workman in this respect, and works on just principles without knowing it. The New Zealander or the South Sea Islander first *forms* his war-club or his paddle of the shape best adapted for use, and then carves the surface to ornament it. The Swiss peasant, or the shepherd of our own hills, does the same. Such also is the case in the Eastern specimens of these works in the Exhibition, as is particularly exemplified in some choicely carved sandal-wood boxes in the Indian department. Here the natural and the refined taste agree, for the best wood-carved ornament of the Renaissance is on this principle, low in relief, seldom projecting beyond the surface of the pilaster, or the framing of the panel. In this respect the French furniture as a whole is advantageously contrasted with ours, there being less of that imitative treatment, of those hulky lurches of flowers and fruits, which project in such graceless abundance from a large number of the British productions. This arises partly from their far greater knowledge, partly from their better appreciation of the laws of ornamental treatment and arrangement.

Another subject requiring attention from the designer is the judicious choice of the materials from which the works are to be manufactured. Allusion has before been made to the error of adapting one material to the ornament which had been designed for another ; but besides avoiding this fault, the material itself should be so employed as to display it to the greatest advantage, and to produce the fullest effect of which it is capable. This remark applies equally to works of stone, wood, metal, glass, or any other material.

Thus, for instance, in wood-carving care should be taken not only to have the relief so managed as to guard the work as much as possible from accidental injury, but the designer should seek to adapt the forms of the ornament to the direction of the grain when it is open or free, and the work should be framed with a view to this consideration ; moreover, ornamental carving should not be applied to wood of strongly-marked party-coloured grain, but that which is homogeneous in colour should be selected for the purpose, in order that the shape of the ornament may as little as possible be interfered with by being mixed up with the forms and colours of the grain. It is curious how much costly and skilful labour has been thrown away from inattention to such minor considerations as these. Again, in metal work a careful study of the material will suggest, among other things, the proper treatment of the surface : this is a matter of the greatest importance to the general effect. A due distribution of burnish and mat, of gilding and plain, or of the various kinds of surface tooling, or frosted work, is of the utmost consequence—not to save labour, though this may result from it—but to give richness without gaudiness, and to enhance the beauty of certain parts by contrast with

others. When the whole surface is burnished indiscriminately, as is frequently seen, the result is a glitter which obliterates form; when the whole surface is mat, the peculiar quality of metal seems lost from the want of burnish.

In some of the furniture exhibited, otherwise of much merit, the ornament is merely conventional, and derived from known examples; while in others, it has been so designed as to have a significance and motive in its adaptation. To such we should naturally allow the higher merit, but conceits and puerilities are so numerous in works of this class, as almost to destroy the pleasure which arises from ornament specially designed. We shall, however, have the gratification of referring to some well-considered works of this kind which are evidently the results of an imaginative and thoughtful mind.

There are not many "designs" for furniture in the Great Exhibition, besides those which are shown by persons exhibiting also manufactured works of a similar kind. In such cases it has been thought most desirable to judge of the manufactured product rather than of the designs; even LIENARD on the French side, and C. J. RICHARDSON on the English, the two largest exhibitors, may thus be judged of, since they both exhibit completed works.

These general remarks will serve to introduce the first subdivision of the section—

CABINET-WORK AND FURNITURE OF ALL KINDS.

The furniture of a man's house had need to be well designed, well constructed, and judiciously ornamented, for, from being constantly under his hand and eye, defects overlooked at first, or disregarded for some showy excellence, grow into great grievances, when, having become an offence, the annoyance daily increases. Here at least utility should be the first object, and, as simplicity rarely offends, that ornament which is the most simple in style will be likely to give the most lasting satisfaction. Yet, on looking over the various articles of cabinet furniture exhibited, how seldom has this consideration been attended to! The ornament of such works on the English side consists largely of *imitative* carving; bunches of fruit, flowers, game, and utensils of various kinds in swags and festoons of the most massive size and the boldest impost, attached indiscriminately and without meaning to bedsteads, sideboards, bookcases, pier-glasses, &c., rarely carved from the members of the work itself, but merely applied as so much putty-work or papier-mâché might be. The laws of ornament are as completely set at defiance as those of use and convenience. Many of these works, instead of being useful, would require a rail to keep off the household. A sideboard, for instance, with garlands of imitative flowers projecting so far from the slab as to require a "long arm" to reach across it, and ever liable to be chipped and broken; and cabinets and bookcases so bristling with walnut-wood flowers and oak-wood leaves, as to put use out of the question. Now, besides that such treatments are not ornamental, they are not beautiful, and only enter into competition with stamped leather and gutta-percha. There is great reason to doubt if this merely imitative carving is ever just in principle, when applied ornamentally to furniture; for, although the masterly chisel of Grinling Gibbons has raised it to great favour in this country, and although it may be tolerated when executed as skilfully as is that on a pier-glass frame by W. G. ROGERS (Cl. XXVI., No. 195), yet it becomes absolutely unbearable under less skilful hands, and when it is lavished in such

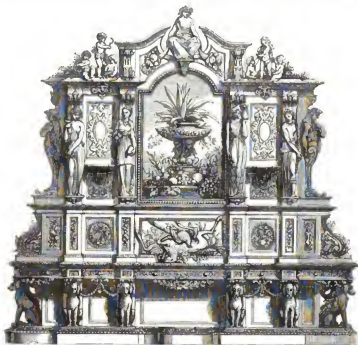
profusion as we find it on many other works. On the foreign side, as has been remarked, there is far less of this false mode of decoration, and a better sense of ornament prevails; the works are more frequently designed in the traditional styles. In France, a modification of the Renaissance is principally used, and in this the ornament is in low relief and does not interfere with use; although false construction is a vice of that period, which has not been remedied in modern works, but is sometimes exaggerated.

The style of Louis XV. lingers in some of the French works; its playfulness of line and surface, its varied treatment and mixture of materials, together with its showiness, still command favour with the multitude. In the French Court (and in some works on the English side, probably of French manufacture) it is seen in its genuine character. The surfaces of these works are curved, when practicable; they are veneered in party-coloured woods, and panels are formed by or-molu mouldings, often in both instances completely at variance with the true construction; and occasionally the panels are filled with porcelain enamels, the whole having at least a gay and sparkling appearance. Some attempts have been made in the English Department to adapt ornament of this period to cabinet furniture, but it has been totally misunderstood. Instead of the treatment above described, the bold scrolls and shell forms used in the decoration of rooms at that period are here seen carved in all their coarseness on furniture. Such works bear out the remark before made, that these forms were especially adapted for gilding, and indeed, are hardly bearable, except when so treated, or when made of metal. This becomes even more apparent when full-coloured woods are used, such as mahogany; in this material the ornament is even more coarse and heavy than in lighter-coloured wood. Since, however, the vendors of cheap furniture have adopted this manner as a cheap and flashy decoration for their goods, it is to be hoped that it will soon be entirely proscribed, or retained only by such dealers.

Those designers who unreservedly adopt the ornament of past times must, of course, apply it to their works without any peculiar significance or connected idea, but merely for its beautiful forms, elegance, grace, or richness. Where, however, any significant allusion, sentiment, or happy idea can be embodied in the ornament, uniting it with the use and intent of the work on which it is to be placed, it will have a charm which the others want. Not that this want is peculiar to the application of traditional ornament, since the designer in the natural or imitative manner seldom attempts any connexion between his decoration and the work to which it is to be applied. There seems no fitness, for instance, in surrounding the frame of a pier-glass with dead birds, game, shell-fish, nets, &c., although they may be excellent specimens of carving; nor is it clear why eagles should support a sideboard, or dogs form the arms of an elbow-chair; nor again, why swans should make their nests under a table, at the risk of having their necks broken by every one seated at it: indeed, in most cases, as such imitative forms cannot in the strict sense be called ornament, they almost challenge inquiry as to why they have been adopted, and disappoint us when we find it has been without motive: this is not the case with traditional ornament, which, like the current coin, is accepted at once without inquiry.

The sideboard, carved in walnut, as here shown, and which is exhibited in the French Court, by FOURDINOIS (France, No. 1231), is an apt illustration of ornament

having a just and characteristic significance. This piece of furniture is of rare excellence and merit in design, and of skilful and artistic execution as to carving, and,



although of a highly decorative character, is fitted for the purpose for which it is intended. Six dogs, emblematical of the chace, resting on a floor of inlaid wood, support the slab, which has a simple carved moulding along its front, and is inlaid in geometric forms. The dogs are not merely imitative, but are treated as a part of an ornamented bracket or console, thus composed architecturally for bearing and support. Above the slab, standing on four pedestals, are female figures, gracefully designed as emblems of the four quarters of the world, each bearing the most useful production of their climate as contributions to the feast. Thus Europe has wine; Asia, tea; Africa, coffee; and America, the sugar-cane. In the central space between the pedestals, which is rather the widest of the three, the products of the chace are poured out on the very board, and above this the space is filled with a framed picture of rare fruits, giving an opportunity to enliven the work by the addition of colour, without militating against good taste; above the figures, which are treated as statues, the cornice is bracketed, and supports boys with the implements of the vineyard and of agriculture. It rises into a pediment in the centre; this is broken in the manner of the Renaissance, and decorated with a figure of Plenty crowning the group. The upright line of the back is gracefully varied at the sides, and constructively strengthened by carved brackets, above which

are terminal figures bearing the implements of fishery on the one side and of the chase on the other. The panels of the pedestals and of the side compartments below are filled with carvings formed of the fruits of various countries, grouped with the instruments of horticulture and agriculture. Two brackets on the side compartments between the figures give an opportunity for placing silver plate in a position for display. The ornamental parts of this piece of furniture are carved throughout in a masterly manner, and in a bold and free style; it is consistent as a whole and free from puerilities, and, while it is thoroughly fitted for its purpose as a sideboard, it is at the same time of a highly ornamental character, without any of its decoration being overdone or thrown away. It corresponds in its constructive form with the Renaissance of the 15th century,—in the style of its carvings, rather with the works of the 13th; the gates of Ghiberti having evidently supplied the idea of the groups of fruit and implements which fill the panels; and it may be remarked as a fault, that it has been overlooked that the relief in Ghiberti's work was suited to metal, the ornament standing beyond the face of the framing of the panel; but in adapting it to wood this should have been modified so as to bring the impost of the carving within the surface; such faults, however, are trifling in a work otherwise of great ability. The care which has been taken to keep all the ornamental details in the same scale throughout is an additional merit, and the wood has been judiciously chosen as to colour and grain.

When we turn from such works as the above to furniture designed strictly in accordance with the rules of a traditional style, we feel that there is often a cold propriety about it which requires consideration before we can admire it; yet among such are some of the best works of the Exhibition. The wardrobe of T. F. WIRTH, of Stuttgart (Wurtemberg, No. 70); the console-table and glass of A. BARBETTI, of Siena (Tuscany, No. 74), are excellent specimens in their kind, well designed constructively, and ornamented in exact conformity with the Renaissance style; the cabinet of RINGUET-LEPRINCE (France, 1437) has high merit; the ornamental treatment of a picture-frame by M. J. LIENARD; the cradle in the Fine Art Court (353), so skilfully carved in boxwood, by W. G. ROGERS, from a well-composed design by his son, W. HARRY ROGERS, also; and a sideboard by a student of the SCHOOL OF DESIGN AT SHEFFIELD. With these exceptions, the best works are in the French Furniture Court, although in them the style is often mixed, and the constructive faults of the Renaissance have been adopted as well as the ornamentation. In other styles, perhaps, the best example of a careful adherence to tradition is observable in the furniture of the Mediæval Court, as in a Gothic sideboard really fitted to display a service of plate; a carved oak cabinet bookcase, by J. G. GRACE (Cl. XXVI., No. 530); and other works. These are particularly to be commended for their sound constructive treatment, and for the very judicious manner in which ornament is made subservient to it. The metal work is also excellent, and the brass fitting of the panels of the bookcase deserves to be studied, both for the manner in which it has been put together, and for its graceful lines. The candelabra of the sideboard also are sensible forms, without any unnecessary ornament. Such furniture in old times was often ornamented with mottoes or texts, a practice which might well be revived, as having far more significance than the commonplace conceits of much of the ornament of the present day. It

may perhaps be objected that the general forms of furniture in this style want variety, and this is rendered more apparent by the florid lines of many of the works around them; but the principal reason will be found to arise from a due consideration of the true constructive treatment of *wood*, which is ill adapted to curved forms on account of its grain, and requires horizontal and perpendicular lines as the basis of framing. The ecclesiastical character of the works in this Court has been already alluded to. It must be remembered that the spirit of the age from which they have been adopted was to bring a sense of the pervading authority of the Church, and the *outward* forms of religion, at least, into all the offices of daily life. This was altogether changed when the revival of ancient learning and of ancient art destroyed the Christian symbolism of ornament and deluged the Roman Church with decoration derived from Paganism, and consequently entirely opposed to the true spirit in which all ecclesiastical ornament should be conceived. The change in ecclesiastical decoration soon pervaded domestic furniture also, and ornament lost all significance and symbolic life. Some credit, therefore, is due to the revival of a better and purer state of things, and a return to the old paths and avoidance of the present mere sensualism of ornament. Yet it is not on this account, but as examples of careful and strict adhesion to true *principles* of construction and ornamentation, that the works in this Court are so often alluded to; they deserve commendation for their illustration of truth, and as showing what one man, by earnest and well-directed attention, can achieve in the reformation of taste, and in the training and forming of other minds to assist in his truthful labours. Their unity of character, moreover, is not the least among their many excellences.

The cases of musical instruments have been barely alluded to in this section of our Report, although they must be classed under the head of furniture. Such works, exhibited in various parts of the Exhibition, display a vast amount of labour entirely thrown away, and tending only to vulgarize that to which it is applied. Some pianofortes are entirely covered with inlays; some with gilding; some have pillars that support nothing, and carved brackets applied to no purpose. There is little harmony to the eye, however much may be produced for the ear: common sense, nevertheless, would seem to require simplicity in the exterior decoration, that one organ may have rest while the other is occupied. The thought indicated by the ornament is frequently most commonplace, being often that of a whole concert of musical instruments around the one ornamented, or their substitution for brackets, columns, or legs. There seems to be as little invention as fitness in adapting lyres as legs to pianofortes, yet this has been resorted to, whilst any consideration of a better mode of *applying* the support, especially in the case of grand pianofortes, appears to have been overlooked. Some of the best makers, both native and foreign, have contented themselves with carefully selected woods of choice grains, enriched by carved or gilt mouldings only, and have justly relied rather on the merits of their instruments than on the gaudiness of the cases. This is, at least, sensible, since the ornament of such works is quite supplementary, and will less bear overdoing than on many other articles of cabinet furniture.

Inlays of metal, mother-of-pearl, or tortoiseshell, may be introduced with excellent effect in furniture; but they must be used sparingly. Such a marvel of labour as the table exhibited by PEREZ (No. 271A), in the Spanish Court, of course

does not come within the scope of this remark ; the subdued colour of the wood used, and the forms chosen, are nevertheless so judicious, that as a piece of ornamental inlay it is excellent for its art, as well as from its curiosity as a feat of labour. Some of the buhl cabinet furniture in the French Court may be instanced as showing that an excess of really beautiful ornament tires us, and causes meretriciousness. There are some excellent specimens of geometrical wood inlays for furniture exhibited by MARCELIN (France, No. 606), and the inlaid top of a table among the furniture by LEISTLER, in the Austrian rooms, has much merit ; such inlays come under the same general laws as mosaics, which have already been treated of ; requiring great simplicity and perfect flatness. The table (No. 112), in *pietra dura*, by BOSCHETTI (Rome, No. 17), consisting of a wreath of orange-flowers, bordered by a simple line, is in the purest taste ; the more costly one near it is marred by the introduction of a band of architectural ornament, contrasting far too strongly with its ground,—a fault worthy of notice, as it prevails largely in similar works.

The furniture in *papier maché* is almost wholly of English manufacture ; it is derived from the old importations from Japan, but has gone far beyond such goods in its excess of decoration : it is the most gaudily decorated of all manufactures, and seems quite beyond the pale of any just principles of ornament. There is no apparent reason why this material should not be used for chairs, couches, tables, or cradles ; but the art of designing for it is not yet attained : as the material possesses peculiar properties of strength and lightness, without needing any framing, it should be considered purely for itself, and the designer must forget all other constructive forms. As to its ornamentation, the sooner it has a thorough revision the better, since at present it is a mass of barbarous splendour that offends the eye and quarrels with every other kind of manufacture with which it comes in contact. The simple lacquered work of India may afford an example for the ornamentation of *papier maché*. Figs. 2 and 3, plate 3, are specimens of lacquered ware taken from the tops of small boxes in the Indian Department. The purely ornamental treatment of the forms and their elegant flowing lines, with the agreeable manner in which both gold and colour are dispersed over the surface, is a lesson of richness without gaudiness worthy of the attention of the manufacturers of *papier maché* : and when it is remembered that this ware is of the commonest and cheapest character, it serves to show that vulgar forms and bad ornament are not necessarily connected with cheap manufacture.

Some of the greatest faults in the furniture of the Exhibition are its unsuitableness to uses, and its false construction. Look, for instance, at the costly articles of the Austrian rooms, and it will be found as skilful in execution as it is deficient in adaptation to its intended purposes. The bed looks more fitted for a corpse to lie in state on than for a place of repose ; it is a congeries of parts without an object : the footboard is so high and solid, that it shuts in the sleeper as in a prison, and completely impedes the free circulation of air ; the footposts rise from massive purposeless bases, and dwindle into mere sticks as they approach the heavy canopy ; the wood selected is unsuitable for carving, its party-coloured grain blurring the ornamental forms. In the other furniture like inconsistencies appear ; in the cabinet, large spaces are thrown away, and therefore, though occupying much room, it has little that is available for use ; the centre space, with its canopy

(though pretty), has no apparent purpose, and it is quite disproportioned to the size of the wings, besides being deficient in the appearance of support. The bookcase has the same fault of room thrown away and of unsuitableness to use, besides being a false adaptation of Gothic stone forms to wood-carving. This latter fault is elsewhere also largely prevalent; it is an error in most of the Belgian furniture. Thus we have a wardrobe which would be more characteristic as an oratory, and a bookcase with arches that support nothing, and buttresses which have no thrusts to resist. Indeed it should be remembered that the arch is not a wooden, but essentially a stone construction; it will be evident, on a moment's consideration, that it is a means of obtaining support by a number of separate small parts, the reverse of timber construction. It ought, therefore, to be well considered before being used in wood, wherein it should arise rather from coupled knees or brackets introduced to strengthen horizontal beams, than as an independent form. Its improper use will also be seen in various sideboards on the English side. In these the back consists of a mirror, over which a wooden arch is thrown; the glass having the effect of a void or opening; the thin wooden arch, bearing nothing, not only has a meagre appearance, but, having nothing to sustain its thrusts, is quite as much at variance with the use of the materials as it is with a proper sense of construction. One of the best of such treatments is seen in an elegant cabinet and mirror exhibited by Mr. SNELL (Class XXVI., No. 170), wherein a light inner column and arch, metallized by gilding, is introduced with good effect; even here, however, the pilasters which support the outer arch seem to want brackets at the sides of their base to give more appearance of support, for the introduction of which there is ample space; the small abortive ones which are used serving only the more directly to point out this want.

Sham construction is another error alluded to, not only of the kind before spoken of,—the suppression of the true constructive forms, as panels, framing, &c., and giving undue prominence to others,—but also where those portions which are intended for support (as, for instance, columns in cabinets, legs in sideboards, &c.) are made to move from under the parts intended to be supported when opening the doors of the furniture. This is a common case in cabinets designed in the Renaissance style, and has the authority of some of the best antique specimens; nevertheless, it is a constructive fault, and is instanced because it is the source of many like errors of a more glaring kind, as where legs are made to remove, or where the whole front of a cabinet or wardrobe is made into doors hanging to the sides without a framed facia and hanging style, and both the side and centre columns (where columns are so used as decorations) are made to move with the doors.

In reviewing the furniture of the Exhibition, the question of the education of the art-workman again comes prominently under review. While it must be confessed that the general design of the French works in this class are greatly in advance of our own, it is also apparent how much more widely diffused in France is that art-knowledge, which, combined with handicraft, constitutes the true art-workman. Although this is peculiarly seen in works in metal, it is evident in many other branches of industry. Wherever the human figure is used as ornament in English works, it is pretty sure to be faulty: the figure may be well composed, may be evidently designed in good taste, since that is often the work

of a superior artist; but in the execution it is almost always disfigured and spoiled. The extremities are finished without knowledge of the internal structure, the fingers, toes, and joints have no bones within the skin, but that "gummy" undecided treatment which evidences the ignorance of the workman. In wood-carving this is equally apparent, even when it consists only of ornamental forms. Very often in such work the "design" of the ornament would seem to be by the same unskilled hand that carved it, since it is mostly out of place, coarse, and merely "natural" in style, and rarely reaches beyond the expression of the most commonplace thought, or the imitation of the commonest fruits and flowers, that great power of imitation and skill of hand, however, are not wanting in the English carver, is evident from many examples, and is particularly shown in the beautiful and delicate flowers, &c., of T. W. WALLIS, of Louth (Fine Art Court, Class XXX. No. 89), which are quite equal to the French works in the same style; but even these go no further than imitation, and the human figure cannot be carved by a merely imitative process:—success in rendering either the human figure or animals when in life and motion can only be the result of knowledge attained by a careful study of the structure of the bony frame-work and of the moving muscles; and it is the want of such anatomical knowledge and of a proper training in art that causes the deficiency we are obliged to notice in the English Department, and compels the carver to confine himself to mere works of imitation, knowing that higher are beyond his powers.

The two figures in the front of the cabinet of RINGUET-LEPRINCE, for instance, are unapproached by anything in English furniture; as is the rare excellence of the carvings on the sideboard of FOURDINOIS, and the works of LIENARD. Even where the figure has had a partial study, the imitation is often cold and "mannered;" the letter is followed rather than the spirit, and it is almost impossible to find a workman entering into the feeling and spirit of the artist-designer, and treating the work in a good and bold style. The bronzes of men and animals are perfect instances, in French works, of the power of the workman to enter fully into the feelings of the artist, and to appreciate style and intention, but the same union has hardly anywhere been attained by the English workman. The Belgian carvers, with Geerts at their head (a perfect artist in wood), are advancing in the same direction, and it must be allowed that the Austrian figure carving, as shown in the furniture of LEISTLER, is much beyond ours, while the Berlin casting and chasing of small works is fast rivalling the French, and in some cases is in a much purer style. The carving of Italy is careful, but tame, and inclined to littleness; this will be seen by comparing the style of the children in BARBETTI's table and mirror, a work otherwise highly commendable, with the gusto and vigour—the larger manner and bolder treatment—of some of the French works. The children on a small scale in the bookcase of HOLLAND and SON, which contains some otherwise good carving, show the timidity of the English art-workman when he has to deal with the figure. Some very small panels, carved in white wood, on a sideboard by J. M. LEVIEN, are in better style, although very minute, but the general want of knowledge is too apparent. This deficiency of power and skill in the human figure is only an additional evidence of the want of better education for our art-workmen. They need to have proper treatises prepared for them, laying down the principles of ornament, and giving them a thorough foundation in practical geometry, form,

proportion, and, above all, in anatomy, together with a careful education of the hand and eye; and unless the Government and the manufacturers of this country are soon awakened to our deficiencies, and prepared to make great sacrifices, we must be content to lag still further behind as the world advances, and for the future to be manufacturers of cheap goods, leaving excellence and beauty to our continental neighbours.

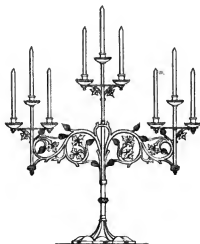
HARDWARE

Under this head are comprised grates, fenders, fire-irons, stoves, gas-fittings, lamps, and various miscellaneous applications; the whole being largely connected with ornamental design. The works in this section, however, are not more miscellaneous in their use than they are in their style of ornamentation, almost every manufacturer endeavouring to exhibit in any and every style. Thus we have Greek candelabra adapted to many uses, Gothic chandeliers and Renaissance lamps, with a pretty large sprinkling of the forms and ornament of Louis XIV. and XV., to which, on the English side especially, is to be added the *natural style* before alluded to, which, adopting foliage or flowers as its leading idea, presents them as they grow, without any constructive or architectural arrangement whatever. Yet even this is encouraging, since it indicates a desire for something more than mere reproductions of the antique, or that *mêlée* of ornament which the ignorant gather from many works, and re-assemble without taste or appropriateness; it at least indicates a change. In a great portion of the metal works French taste is found largely to prevail on both sides of the Building; nor is this to be wondered at, since, for a long time, the lively fancy and invention of many excellent French artists have been directed to designing and modelling for these goods; ably seconded, also, by trained and educated workmen capable of appreciating their labours, and completing them by skilful casting, chasing, and fitting. But the tendency of the French mind towards display has resulted in over-ornamentation, and it is unfortunate that this fault is rather a merit in the eyes of the world, and has been eagerly adopted by the manufacturers of other nations, more especially of our own, that which is meretricious being retained, whilst what is really excellent in French design, and especially in French workmanship, is overlooked by them, or is unattainable.

Moreover, whilst the most able French artists in metal, eschewing the gaudy style of Louis XV., have returned to a modified form of the Renaissance, and have given it somewhat of newness of character, the English designers for hardware (with a few exceptions) either still adhere to the contorted style first named, or produce works composed of ornaments pirated from all times and all nations, put together without any sense of construction, without selection and without fitness. Such works are a thorough chance-medley that disgrace our manufacturers, and make us look back to the simpler forms of the middle ages with respect and regret.

Let any one examine the characteristic simplicity of the candlestick here engraved (exhibited by Messrs. HARDMAN, from a design by Mr. W. Pugin), adapted as it is for use, standing firmly, capable of being handled, light, yet strong, and compare it with the showy works around it, so *ragged* and tangled with ornament that all characteristic form is lost, branched arms bristling with foliage weighing down rather than bracing and supporting them, with perhaps a bunch of flimsy

chains dangling in the way of those who would touch or lift them, or two or three Parian Cupids basking at the foot, or bearing up the candles; and where the



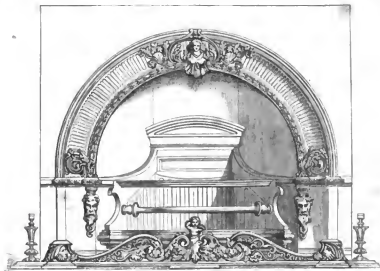
hand should grasp the stem to lift the candelabrum, the ornament so sharp and thorny that to touch it would be impossible. In making such a comparison can we do otherwise than feel that the one is honest, useful, characteristic, and therefore beautiful, whilst the others are flashy and grotesque, full of little prettinesses, which some misname "ideas," put together without any leading motive, and having no definitive character or true construction?

The faults of English design for hardware are obvious to every one; the error of the French designers is equally open to the most superficial observer. In the great mass of these works there is no rest for the eye—the whole surface is nothing but ornament. Thus, for instance, the French art-bronzes have justly obtained a wide reputation, and the works of Denière, Pradier, Méné, and other French artists, are sought for all over Europe; but when such become a part of manufacture, and liable to be classed as hardware, art is overlaid with ornament, and the skill of the workman is directed to that which degrades the work, and sadly militates against good taste. Thus, figures designed with much fancy, and modelled with ability and vigour, are vulgarized from the imitation of fur and of the texture of the garments, of buckles, buttons, and ties of the dress, of chain or plate armour or weapons, whilst the homogeneity of the bronze is no longer retained, but various parts of dress are treated in various tints of the metal; and all the different qualities of surface, such as tooling, frosting, and burnishing, in which it is but just to say the workmen are most skilful, are brought into play to *enrich* the effect; while sometimes we have, in addition, combinations of many materials, such as marble, porcelain, ivory, and bronze, united in a single work.

Another class of works are those anomalous candelabra composed of porcelain

vases filled with a bunch of flowers in or-molu, a few bearing candles amongst a number of barren branches, the whole being a bush of glitter and burnish. This is the direction which naturalism in ornament takes in France. Such works have a total absence of constructive feeling, and an equal want of proper treatment of metal; to add to their finery, an *épergne* of artificial flowers is often mixed up with metallic ones, as a centre-piece for the dinner-table. There are many large candelabra in various parts of the Exhibition—in France, Holland, Austria, and Russia—which evidence the wide dispersion of French style, and contain exaggerations of the most frequent French faults. The error, however, does not wholly rest with the designer, since it will be long before he has a public sufficiently educated to relish the amount of plainness which is absolutely necessary to give the true value to each part enriched.

Grates.—Grates rank among the principal works in hardware to which ornamental design is applied, at least on the English side, and there by far the best specimens both as to design and workmanship are to be found: this was to be expected from the general necessity for warmth in our cold and variable climate; an Englishman's love for his fireside having passed into a proverb. It is gratifying also to see that the design and decoration of these goods have greatly improved in the last few years. Some works of great merit are to be found among those



exhibited, while the workmanship generally is excellent. There is, however, an evident tendency to do too much, and it is incumbent on designers for such goods carefully to avoid this, and to endeavour to restrain manufacturers from such treatments of the metals as lead to gaudiness and glare, and by which, at the same time, the grate itself is rendered less useful. The great secret, after constructive use has been considered, consists in the proper and judicious treatment of the materials, which offer great advantages for contrast, either with or without the

introduction of hronze or or-molu. True excellence will be found to be closely allied to simplicity—a moderate use of ornament and of the burnisher, and the contrast of broad flat masses of plain metal with ornamented or burnished mouldings, with inlays of brass, or with bronze and or-molu ornaments. The arched form which has generally been adopted for grate-fronts is architecturally suitable and agreeable in outline, giving ample opportunity for ornament in the mouldings of the arch, as well as in the spandrels, besides having sufficient surface of metal to contrast with; moreover, it is not likely to interfere with the architectural arrangement of the mantel-piece to which it may have to be fitted. Messrs. ROBSON and HOOLE exhibit several grates designed by Mr. A. Stevens, highly decorative in character, and of great general merit; two especially, fronting on the Central Avenue, designed in the Renaissance style, evince great artistic ability. The one engraved, however, which is exhibited by them, is more constructively simple, and sufficiently ornamented for its office as an article of furniture, while it displays most judicious use of the material. The face is of ground cast metal, the ornamented moulding of pale bronze, with the leafage of brass, and the figure bronzed, while some semi-burnished lines about the fire give a very chaste and tasteful effect; the fender is also of bronze and brass, with the leading lines burnished. Much more ornament than this would raise the grate out of its right place in the scale of furniture, and draw undue attention to it; its sober simplicity is more to be commended than many of the very highly ornamented grates around it. Messrs. STUART and SMITH have also some meritorious works as to design, but from the excessive introduction of burnished surfaces the grates look too fine for use. Messrs. Hooley have avoided this by a large introduction of the ground metal, which contrasts excellently with either burnished or brass ornaments, and adds to their beauty by its own repose and sobriety. It can never be too much insisted on, that ornament loses its value when it overloads a work, and that large unornamented spaces are required to enhance and give zest to the decorated parts. As we descend to grates designed by inferior artists, we find excess substituted for excellence, and works of such brilliant gaudiness of surface as to be quite unfitted for their intended use; indeed, the process of keeping them in order would seem to require that a whitesmith formed part of our establishment, or that the housemaid should have a practical education to enable her to take to pieces the elaborate constructions which would come under her care, independently of the skill required to clean them. Messrs. Stuart and Smith have made attempts at the combination of materials with some success, and have also some cleverly designed metallic inlays for hearths.

It is tiresome to repeat what has so often before been said, that use ought to be considered before ornament; yet no section of furniture suffers more from neglect of this rule than that comprised under hardware, not only in the works exhibited in the British, but in all parts of the Exhibition. In some cases this shows itself in applying a form or construction suited for one use, to another for which it is quite inapplicable. Thus some chandeliers in the French Court, which at first sight seem cleverly designed and a skilful treatment of the metal, on examination are found to consist of a large central lamp, which alone is intended to give light, surrounded by a circle of branches bearing sham candles, not intended or prepared in any way for illumination, but introduced merely to allow of a little extra

ornament. From the same cause results the impertinent *application* of figures, in bronze or in Parian; a fertile source of bad taste. These are too often merely added to the work, and not constructively treated, and thus seem to have no real relation to the forms they are connected with. Hence the manufacturer is enabled to adapt the same figure to many purposes, and to the most opposite uses; sometimes at the base of a chandelier, sometimes at the top, and sometimes perched upon the branches. Profitable to the manufacturer this may be, but it is as completely opposed to every just principle of design as to every hope of progress or good taste.

In the treatment of metal the rendering of the surface demands the most careful study, since much of the beauty of a work results from this being properly understood. No doubt the true lustre of metal is only given in the burnished state; but when burnishing is introduced in any quantity it becomes not only tormenting to the eye but wants contrast to bring out its brilliancy. Moreover, by its glitter it obscures ornamental forms, which rarely look sharp or clear in their details under this treatment. When figures or animals, introduced for decoration, are burnished, their true form is almost undistinguishable on account of this glitter and the reflection from the polished surface, besides the pressure of the tool completely destroying all details of form and surface. Yet many important works (a clock in the Russian Court may be especially instanced) have the figures entirely burnished. The evil caused by a glittering surface in such works is duly appreciated by the French artists, who have wisely adopted bronze as the material for figures in the baser metals, and have overcome the difficulty by oxidation in their works in silver. A medium state of the surface between mat and burnished, though much to be desired, is not always obtainable, nor has it perhaps been sufficiently sought. Bronze, however, from its colour, partially supplies this want; and the mixed metals, and ground cast-iron from its duller polish, afford good contrasts to burnished iron or steel.

While our use of burnish often tends to blur and destroy form, the older workmen took advantage of a polished surface to produce ornament; this may be seen in some of the old church chandeliers, of which the central trunk, consisting of a plain turned boss, seems richly reeded when the branches are lighted, merely by the reflection of the lights on the metal.

In most of the modern works, burnished and matted surfaces seem to be used indifferently or at random, instead of applying the burnisher to give variety to recurring forms, or to enhance leading lines. These are often entirely matted or tooled, and those parts burnished which will give the greatest flutter and glitter to the object.

The *natural* taste in connection with the ornament of hardware has already been condemned. It is as false in construction as it is to all just ornamental principles.

The facilities which modern mechanism gives to the production of ornament, and consequently to over-ornamentation, have also been adverted to in the earlier parts of this Report. It is to be hoped that in view of these facilities manufacturers will see their own interest, and seek the best designs at any cost, since these will frequently be found to combine cheapness of production and simplicity with good taste. There can be no doubt that half the ornament in the Great Exhi-

tion, and consequently the labour expended on it, is in excess ; that is to say, that a better effect might have been produced without it ; and this wasted labour might have been bestowed on the more careful completion of simpler designs, to the enriching of the manufacturer, and the great advantage of the public taste.

CARPETS.

The use of these fabrics suggests the true principle of design for their ornamentation ; which is governed by the laws before given for flat surfaces, where the object is rather to treat the whole as a background than to call particular attention to the ornamentation. Flatness should be one of the principles for decorating a surface continually under the feet ; therefore all architectural relief ornaments, and all *imitations* of fruit, shells, and other solid or hard substances, or even of flowers, strictly speaking, are the more improper the more imitatively they are rendered. As a field or ground for other objects, the attention should hardly be called to carpets by strongly-marked forms or compartments, or by violent contrasts of light and dark, or colour ; but graduated shades of the same colour, or a distribution of colours nearly equal in scale of light and dark, should be adopted ; secondaries and tertiaries, or neutralised primaries, being used rather than pure tints, and lights introduced merely to give expression to the forms. Under such regulations as to flatness and contrast, either geometrical forms, or scrolls clothed with foliation in any style, leaves, flowers, or other ornament, may be used, which, with borders and compartment arrangements, and the use of diaper treatments, leave ample room for variety and for the inventive skill of the artist. It may be thought impossible or unnecessary to confine the designer too strictly by such laws, and they are, indeed, rather stated from a sense of their truth than with an immediate hope of their thorough acceptance, but at any rate they may serve as curbs to extravagance of design, and as guide-marks to lead back the errant designer to the path of consistency. In speaking of designs for these articles we turn first to France, both as the largest contributor of designs generally, and because the importance of her national manufacture of these fabrics must claim for them our first consideration. Three of her principal ornamentists exhibit designs for carpets ; two of them, however, seem to consider any such principles as those given entirely unnecessary : their works might as well be florid designs for the decoration of ceilings, if such a false system could be applied anywhere. Thus one of the most important carpet patterns of one of these artists bears a deep border of architectural decoration shaded in relief, consisting of shields and scrolls of the Louis Quinze period, with wreaths of flowers rendered imitatively and in perspective. This border seems thrown downward, to form a reversed coving ; within the field of the carpet, as in a mirror, is a forest, with the sky seen through the central opening between the branches, whilst amorini, almost as large as the trees themselves, sport beneath their shade or float in mid-air. The principal work of the second is of a like character, with trees and flowers, fountains and statues, earth and sky, mingled on the surface of the design, in total contravention of those laws which have been presumed to be just ones for such a purpose. The third artist, M. CLERGET, both in his carpet and in his other designs, forms an honourable exception. Flatness, a just ornamentation, and a quiet distribution of colour being the consistent results of his labours. With regard, however, to the

two former, it would be unjust not to speak of the great executive skill, the knowledge, and clever arrangement observable in their works. These, however, by their attraction, only increase the evil such designs foster. The results of such false principles are apparent all over the Exhibition, and are plainly visible in the carpets and hangings exhibited by France. To begin with the establishments which, under royal or national aid, have carried these fabrics to the highest pitch of excellence in all that relates to skill of manufacture, brilliancy of colour, and magnificence of design. In the face of the many and rare excellences they exhibit, both of handicraft and scientific knowledge, the chemist and the botanist having united their sciences with the invention and taste of the painter, it is extremely daring to reprobate the ornamentation of these costly works; but the designers who have laboured for them have, by these very excellences, so largely contributed to the spread of bad taste and false principles in such fabrics, that it becomes a positive duty, in the face even of the highest authorities, to object to the principles on which they are ornamented, if we would place carpet designs on the right footing for the future. That the stream is impure at the fountain head has been shown in reviewing the designs, where the artist, exhibiting what should be specimens of his own taste, has fallen into the false taste of the public, or rather outrun it. In the manufactured products we see the result; the principal carpets exhibited combining a mixture of ornament with natural or imitative flowers, designed with the greatest skill, coloured with the tints of nature, and gracefully and tastefully disposed; the ornament, however, is purely architectural, and in shaded relief, without any sense of flatness; and consists largely of the broken curves, the coarse scrolls, and the shell forms of the Louis Quinze period. In the carpet from the manufactory at AUBUSSON (No. 1499, France) the contrasts of colour, both as to tints and light and dark, are of the most violent kind; distressing the eye, and distracting the attention from any works which might be in juxtaposition with it. The carpet from the Gobelins Manufactory is less objectionable in its contrasts of light and dark, and is highly skilful in its arrangement of colour, but it has the same erroneous use of it, the same adoption of the ornament of another material, the same florid taste and want of flatness. It may be said that these works, designed for the gorgeous magnificence of palaces, can hardly come under sober rules; that they are essentially intended for display. Even allowing this to be the case, such specimens may well serve as warnings of the danger of adopting the like style for more general uses; and even in a palace, the chaste simplicity of its statues, and the subdued hues of the works of high art which should adorn it, could stand little chance of vying with the richness and lustre of fabrics so over-decorated; and the princely inhabitant would certainly share the attention of the spectator with the gaudy carpet which covered the floor.

The English designers contribute less to the Exhibition than their French neighbours, and, although their works are behind the others for skill and execution, some are in a far more sober and just taste. The designs exhibited by the students of the Government School of Design are of this number; being the works of students, it can hardly be expected that they should abound in invention, and we ought to be satisfied to find that good principles prevail in them. There is a good design exhibited by J. K. HARVEY in the Fine Arts Court

(Class XXX., No. 119), and two or three of inferior excellence in other parts; but it may be fairly said that our carpet designers, as a body, have not sent evidence of their skill to the Exhibition, but are to be judged of rather by the fabrics themselves. With the exception of France, already remarked upon, no other nations have contributed any designs.

On turning attention to the manufactured goods, they will be found to consist of such a confused mixture of styles, and to exhibit such a total want of consistency, that it is at once evident the designers, both at home and abroad, are amenable to none of those *principles* which have been explained as governing the decoration of carpets. It is true that among the number of works exhibited there are many of great skill and ingenuity of decorative treatment, of rich combinations of colour, and which nearly approach to excellence; but it is nevertheless obvious, even from their extreme variety of style, that designers and manufacturers feel themselves bound by no laws, and perfectly at liberty to adopt any or all modes of ornamentation, without regard to what is suitable for the material or the uses which the fabric is meant to subserve.

The French designs applied to carpets are largely characterized by the works already remarked upon, the prevailing faults of these being the prevailing faults of the large majority of their works—architectural relief ornament, perspective treatments, want of flatness, crudeness of colour, harshness of contrast, and want of relative scale in the ornament, pervading the greater number of their works. Three imitations of Persian rugs from the NATIONAL MANUFACTORY at BEAUVAIS, from their flatness, quiet contrasts, and broken hues of negative colour, show to great advantage in connexion with the works around them. Nor can it be said that the other European exhibitors follow any sounder principles of design, either in their national workshops or in the general labours of their manufacturers. The prevailing taste of France seems to be that of the continent generally, but with less excellence of details, skill of arrangement, and knowledge of art; and although here and there works of much merit may be exhibited, the absence of true principles is everywhere apparent.

The English carpet manufacturers are large exhibitors, and on the whole the decoration of their best goods may be characterized as less extravagant than the foreign ones, not, however, that there is here any acknowledgment of sound principles, or complete repudiation of false ones. Thus sometimes, as in the carpets of the Medieval Court, and in those exhibited by Messrs. NEWTON, JONES, and WILLIS, a flat floral ornamentation and geometrical arrangement has been duly attended to, but the contrasts are too strong, or the necessary sobriety of colour is not obtained. Sometimes floral decoration has been used, as in the carpets exhibited by Messrs. TUBERVILLE, SMITH, and Co., WHITE and Co., HENDERSON, WIDNELL, and Co., BROWN, MACLAREN, and Co., WATSON, BELL, and Co., and by Messrs. JACKSON and GRAHAM, all which have much merit, but the flowers are often far beyond the natural size, the colours are bright and gaudy, and flatness is not attempted; in short, imitation and not ornamentation has been the rule of the designer. The last-named manufacturers exhibit a carpet designed by John Lawson, which, as greater attention has been paid to ornamental requirements, is given in the accompanying impression. In the carpet itself the border is about half its width too narrow for the centre, but this is not seen in the woodcut; the

colour of the centre consists of gradations of a neutral red, the forms of the border are red on a dull white ground. While it is one of the most commendable of such fabrics, it will serve to illustrate the error of indiscriminately applying the ornamentation of one material to that of another. Thus the design, taken from the excellent work on the Alhambra by Mr. Owen Jones, and there used as a wall decoration, where its "up and down" treatment was characteristic and proper, is no longer so when applied to a carpet, since this requires an "all-over" treatment, or an arrangement towards the centre, a consideration which does not seem to have entered into the mind of the designer. MESSRS. WHITE and Co., and MESSRS. WATSON, BELL, and Co., exhibit carpets of great merit, imitative of those of India and Turkey, and it is only necessary to turn to them from the surrounding works to be convinced of the justness and truth of the Eastern style and application of colour to such fabrics; indeed a most careful examination has confirmed a



strong feeling as to the great superiority of the designs of Indian and Turkish carpets, both in the arrangement and general tone and harmony of the colours, and the flat treatment and geometrical distribution of form. The Turkish carpets are generally designed with a *flat* border of flowers of the natural size, and with a centre of larger forms conventionalized, in some cases even to the extent of obscuring the forms, a fault to be avoided. The colours are negative shades, of a medium or half-tint as to light and dark, tending rather to dark, with scarcely any contrast, and therefore a little sombre in character. Three hues are principal and largely pervade the surface, namely, green, red, and blue; these are not pure but negative, so that the general effect is cool, yet rich and full in colour. The colours, instead of cutting upon each other, are mostly bordered with black, the blue has a slight tendency to purple, and a few orange spots enhance and enliven the effect. The distribution of colour in these fabrics is far simpler than in those from India, which last have sometimes a tendency to foxiness, from a larger admission of warm neutrals, as brown and brown-purple; they also admit of a much greater variety of colours than the Turkish. The colour of the Indian carpets, however, is so evenly distributed, and each tint so well balanced with its complementary and harmonizing hue, that the general effect is rich and agreeable; the hues all tend to a dark middle tint in scale, and white and yellow are sparingly introduced to define the geometrical arrangement of the forms, such arrangement being the sound basis of all Eastern ornament. The illustration given in Fig. 1, Plate 1, is from an Indian rug, and will illustrate the various principles, and the tone of colour contended for. A large silken carpet and a smaller one, exhibited by the HONOURABLE THE EAST INDIA COMPANY, are fine examples of the skill and taste which are evidently traditional in the Indian races.

Having spoken thus highly of the decoration of such goods in India, it is painful to observe the attempts ignominiously made to vitiate the sound taste of the native artists. It has no doubt been done by those who are unaware of the true knowledge and just principles evident, more or less, in all the Indian manufactures; but it is not the less necessary to be commented on, since a school of industry seems actually in operation at Jubbulpore for teaching the reformed Thugs to make carpets in the worst European style, and at Bangalore the same teaching seems in operation. It is to be hoped that, when the admiration elicited by the display of the Indian fabrics at the Great Exhibition is re-echoed back to the land that produced them, this strange error will at once be remedied. Even if good, such patterns are not consonant with Indian tastes, and it is perhaps fortunate that they are really so extremely bad that they may fall at once before the better knowledge which the European judgment of the merit of Indian ornament will call forth and support.

The gross errors to which imitative treatments have led in the decoration of carpets have been already referred to in the general prefatory remarks, and need hardly be insisted on afresh after the definite principles which have been just given; neither need more be said on the error of adopting unchanged the ornament of other materials: it therefore only remains to remark that a certain vagueness of form and absence of flow of line in the Turkish carpets, which sometimes approach monotony, might be remedied by the introduction of strap ornament in the borders, and of diapers of flat floral ornament on the central field, under the same true principles of colour and contrast that these works evince, which, uniting the flowing and varied lines of European decoration with sound Eastern taste in tone, colour, and geometrical arrangement, would suit our climate and uses, and banish some of that trash and crudity so evident on all sides, and which has its climax in the cheap manufactures of these articles. One thing is certainly to be learned from the works referred to, namely, that bright colours are not necessarily rich or beautiful, but that tone is a great source of richness, and has at the same time the farther merit of keeping such goods in their true place in the scale of furniture. No nations exhibit greater richness of what may be called upholstery, or more gorgeous costumes, than those of India and Persia, and the wisdom displayed in the negative tone and subdued colour of their carpets is worthy of consideration, as a means of enhancing and supporting the richness and costliness of their other fabrics and their personal decorations.

Almost all that has been said of carpets is applicable to druggets and felted goods for the same uses, and the principles of their ornamentation, under certain modifications, may be applied to floor-cloths and painted cloth for furniture covers, as well as to printed, felted, and woven fabrics, in various materials, for table-covers.

Floor-cloths are not so much used in this country for dwelling apartments, as in halls, staircases, lobbies, and other approaches, and richness and fulness of colour are, therefore, in general, less needed. The laws which regulate mosaics and inlays for floors will, in some degree, rule these works also, except that wood inlays, especially when large, require a design capable of being framed in its construction, and of having due regard to the shouldering of mortices and tenons, a construction obviously unnecessary in floor-cloths. It is, therefore, requisite to

guard carefully against mere imitations of such designs, and more especially to avoid all imitations of carpet patterns. Frets and guilloches for borders, and geometrical combinations for the inner field, with a centre, may be adopted when the work is large, as in the cloth exhibited by Messrs. SMITH and BABER, which has much merit, although it is too violent in its contrasts; while all-over patterns of simple geometrical diapers, in quiet, graduated tints, have the best effect in cloths for general purposes. The painted cloths for furniture follow a little too much the old Japan colouring, and are heavy and monotonous from their darkness. There are good diapers on some of the French cloths exhibited, and on some of those of GÖHRING and BÖHME, of Leipsic; but their cloths for the ceilings of *carriages* are wormy in line and unpleasantly crude in colour. The table-covers in woollen, cotton, flax, and silk, either woven, printed, or felted, of which there are a great variety in the Exhibition, are often characterized by the same faults as the carpets—imitative flowers and architectural relief ornament, with vases, baskets, &c., forming too frequently the details, whilst the contrasts of colour are sometimes of the most violent kind. Thus there is great richness in a cloth with a border decorated with the flowers of the *Brugmansia*, exhibited by WHITE and SONS (Class XIX., No. 343), but the requisite flatness is not obtained; and there is much merit in a Gothic pattern, with a well-coloured border, exhibited by H. and T. WOOD (Class XIX., No. 352), but the architectural decoration introduced is objectionable.

CURTAINS AND HANGINGS.

The ornamentation of textile hangings follows the same laws, and is amenable to the same general principles, as that of other wall decorations, flatness of treatment and subdued contrasts of colour being the only sure guides.

The richest, and at the same time the most sober effects in silk, are produced merely by the processes of weaving, as of satin figures on a tabby-ground, in a self-colour; and ornament properly suited for this treatment of the silk is generally in good taste, and shows the full splendour of the rich material. Next to this, graduated tints of a self-colour, as gold on straw colour, or even ornament in one colour, on a ground formed of the natural golden tint of the silk, where the contrast is not too violent, has a good effect, and shows to advantage beside those over-decorated works which are covered with natural flowers in many colours; since the lustre and gloss of the silk, and the richness of colour consequent on these qualities, are seen to the greatest advantage in the flat masses of such ornament, heightened as they are by the duller ground, while smaller parts and varied tints interfere with these inherent qualities of the material.

A hanging exhibited by Messrs. MATHEVON and BOUVARD (France, No. 1349), decorated with bunches of flowers, on an ash-coloured lilac ground, displays great ability in the designer, combined with thorough knowledge of the powers of the loom, and it has been executed with equal skill by the weaver; it is, indeed, a choice example of the style; yet its lustre and beauty, and fitness as a hanging or curtain, are not commensurate with the costliness of its production, and it cannot compete for apparent richness of material with a plain mulberry-coloured hanging, ornamented flatly in satin and tabby, that hangs beside it. Had these flowers been treated flatly, arranged geometrically, and coloured in simple tints, they would not

have been so artistic, but they would have been far more truly ornamental, and more suitable for hangings.

There are some well-designed fabrics among the Prussian silks, exhibited by G. GABAIN (Zollverein (1), No. 119), consisting of an heraldic treatment of the Prussian eagle, on a red ground, with the ornament in gold. The silk hangings of the Austrian bed are likewise in good taste. With these must be named the hangings of the Mediæval Court, and those in mixed materials, executed for the Duke of Devonshire by Messrs. REYNOLDS, of Dublin, consisting of fleur-de-lys and shamrock, in silver, on a subdued crimson ground, or in gold-coloured silk, on a watchet ground. The hangings decorated with ornaments from the Alhambra, exhibited by A. DESTRIEUX and Co. (France, No. 164), are in good taste and on good principles, as are also some in mixed fabrics, in the same style, by AKROYD and Co., of Halifax.

The *natural* treatment of flowers as the ornament of textile fabrics is nowhere seen to greater disadvantage than in the rich altar-cloths in gold brocade exhibited by French, Austrian, and Russian manufacturers. The coloured and shaded flowers instantly vulgarise and give a commonness to this essentially rich material; while diapers of colour, or a different texture produced by weaving, or silver threads woven with the gold, as in some of the Russian fabrics, have a rich and true effect.

The consideration of chintzes comes under the head of hangings; and upon these fabrics it is quite necessary to make a few remarks, since their decoration seems at present to be of the most extravagant kind. Overlooking the fact that the lightness and thinness of the material will not carry a heavy treatment, and that, in addition to all the principles which have been shown to regulate designs for hangings, the use of imitative floral ornament is peculiarly unsuitable on account of the folds, the taste is to cover the surface almost entirely with large and coarse flowers—dahlias, hollyhocks, roses, hydrangeas—or others which give scope for strong and vivid colouring, and which are often magnified by the designer much beyond the scale of nature. These are not only arranged in large groups, but often cover the whole surface, in the manner of a rich brocade. Nothing can be more erroneous, or more essentially vulgar, as would at once be evident did not fashion blind us for a time, and a feeling for costly labour and difficult execution prevail over truth and good taste.

Moreover, it is scarcely possible in such distributions of colours, whether printed or woven, to arrange them according to just or scientific laws; for although this is attainable when colour is in simple flat tints, and subordinated to geometrical groupings, when the tints are broken up and gradated into shades, and distributed with regard to flowing and naturally-dispersed forms alone, the due quantities for harmony, the juxtaposition of complementary and harmonizing tints, and true balance of parts, easy in any simple or symmetrical arrangement, becomes difficult or impossible. The present mode of ornamenting these fabrics seems to have arisen from the false spirit of imitation—a desire to rival the richness of silk; but it is overlooked that the texture, naturally light, requires lightness and elegance of form and colour; that, as a *summer* fabric, richness and fulness of hue, as tending rather to a sense of warmth, is out of place, and that, on the contrary, fresh and cool light grounds, with flat ornamental forms, either “all over” or in “up and

down" bands, or diapers of floral ornament, on a simple textural ground, are the true principles for the decoration of chintzes.

Before completing this Report on furniture, it is necessary to say a few words on muslin curtains, of which there is a large display in the Exhibition. These fabrics should, of course, have a perfectly flat treatment, whether purely ornamental forms or flowers are used for their decoration. The best effect for borders is obtained by a symmetrical arrangement of flowing lines, which may be large in pattern, from the lightness of the material; while a diaper treatment, or small sprigs arranged with large and regular spaces over the central field, are the simple rules for their decoration. It would seem hardly possible to err much in designing for a fabric which admits of such small variation, the contrast of the thick work with the more filmy ground being the source of the ornamental form, and colour being rarely used; yet, perhaps, in the whole Exhibition there are not more glaring mistakes than are made in the decoration of these goods. In the Swiss muslins, the effort seems to have been directed rather to curious skill in workmanship than to taste in design, and some of the most costly goods are in the worst conceivable taste—immense cornucopias, pouring out fruits and flowers, palm-trees, and even buildings and landscapes being used as ornament. Even when this only consists of flowers, they are used imitatively and perspectively, foldings of the leaves, and in some cases the actual relief of fruits, being attempted. Although the same faults occur in the English manufactures, these, on the whole, slightly incline to better taste, especially in some of the woven curtains from Nottingham, and in the fabrics exhibited by the UTRECHT COMPANY; but there is a sad want of good design in this class.

Except that curtains allow of an "up and down" treatment, which table-cloths do not, most of the same rules apply to damask table-linen as to white muslin curtains. The ornament of damask linen, arising, as it does, merely from the gloss obtained by various distributions of the warp and woof in weaving, ought to be extremely simple in form; yet even in these goods we find buildings, landscapes, vases, baskets, fruits in relief, and flowers perspectively treated as the details of decoration, while one designer has copied a centre-piece of precious metal, the property of H. R. H. Prince Albert, in the table-cloth upon which it is meant to be placed. These faults are present, not only in the Irish linens, but in those of France and Saxony also. There is a good design, in the German Gothic style, applied to a cloth exhibited by D. BIRRELL (Class XVI., No. 27), and some well-considered adaptations of Greek ornament in the borders of some damasks by A. H. C. WESTERMAN and SONS, of Westphalia; but the general manufacture of such goods wants serious revision. A border of flat ornament, consisting of flowing lines or flat floral treatment, carefully studied as to the distribution of quantities; a diaper geometrically arranged over the inner field, either of floral or ornamental forms, with a judicious interspace (the diaper being rather dispersed than crowded), and a central form, give the best general distribution for the surface of table-linen. Proper attention should be paid, in designing the border, to the quantity allowed for turning down over the edge of the table; and care should be taken, when heraldry and heraldic devices are introduced, that they should be strictly flat. Landscapes, solid and shaded forms, perspectives, and architectural relief ornament, should be carefully avoided. Although the principles which

govern the decoration of these fabrics appear to be simple and self-evident, there are few manufactures where a greater amount of error prevails, the nearest approach to purity of style being floral treatments, imitatively rendered.

In concluding our remarks on the design of this section, we may invite attention to the different relative importance, in an ornamental point of view, of the various articles which are comprised under the head of the furniture of an apartment. These are the work of various manufacturers, each endeavouring to give the greatest amount of decoration to his own works, without duly considering their relation to other fabrics. Thus the carpet manufacturer ornaments his articles so showily that they outvie the hangings—the wall-decorator, or paper-stainer, his goods, till they emulate the cabinet furniture—whilst the upholsterer overlays his share of the furniture with florid carving, with ormolu and inlays, or with rich broderies of silk or velvet, so as far to outshine the rare workmanship of the jeweller or the goldsmith, or the art of the bronzist, the sculptor, or the painter, with which they are mingled.

All this arises out of error; each article of furniture has a due share of importance—a relative value as decoration—beyond which it should never be forced; and the designer for each should have this truth strongly impressed on him in all his labours. We may suppose it easily conceded that the carpet, bearing the relation of the groundwork for objects, should have a quiet richness of surface and texture, intruding in the least possible degree on the eye or the observation; the wall decorations, the next in importance, being entirely of the nature of a background, should be subordinate to the cabinet work; which, in its turn, should hardly be forced into undue competition with the skilful works in glass, porcelain, metal, or the fine arts, for which it serves merely as a means of display or arrangement. Yet how often is this order entirely reversed, and the simplicity of fine art outshone by the gorgeousness of mere furniture! Where the educated taste of a decorative artist is not sought for, this too often arises from want of taste in the purchaser, who selects each object for itself, and not on full consideration of this principle of subordination; but were the designer really alive to the truth of the principle, such gaudy and false ornamentation would hardly be applied to inferior fabrics. Jewellers are careful that the setting be a proper foil to the more valuable stone, but those who have the means of richly decorating their dwellings often make such a show of the setting that it overpowers the gem.

Div. 3.—*Domestic Utensils and Objects of Personal Use.*

The third section of this Report is devoted to the examination of design applied to domestic utensils and objects of more immediate personal use. Although there is not any exact line of demarcation between such works and those more properly ranging with domestic furniture, the division is sufficiently accurate, and is convenient as permitting classification under the separate heads of

1. Porcelain and pottery.
2. Table and ornamental glass.
3. Works in the precious metals, &c.
4. Bookbinding.

It is to be remembered, however, that the Report has reference only to the deco-

rative art applied to such works, and that unornamented objects of utility are consequently not included.

It will at once be evident, that whatever is comprehended in this section ought to display the greatest purity of form and the rarest excellences of ornament, while they should be characterized by the utmost refinement and finish, since they are daily under our hands, and continually subject to minute personal inspection. Their utility, moreover, should have special attention, and convenience and usefulness be carefully studied. Here the ornamentist will have full scope for the highest efforts of his ingenuity and taste ; and when working on the most precious materials, may add by his labour even to *their* value and richness.

Moreover, in those classes in which use is a first requisite, as is largely the case in china, pottery, and glass, the purest forms should be sought, allied to the greatest convenience and capaciousness ; and the requisite means of lifting, holding, supporting,—of filling, emptying, and cleansing, should engage the attention of the designer, before the subject of their ornamentation is at all entered upon.

PORCELAIN AND POTTERS' WARE.

There is hardly any nation, however primitive its state, with whose works we are acquainted, that has not numbered among its manufactures some kind of potters' ware ; rudely made and barbarously decorated perhaps, and imperfectly fired, but sufficient for the simple domestic purposes of people in an early stage of society and civilization.

As nations advanced in culture, their pottery improved also, both in elegance of contour, in beauty of decoration, and in manufacturing excellence ; so that fictile fabrics alone will often mark the standard of national civilization, and indicate the progress of a people in the arts of life.

This has been the case not only with the Greeks and the Eastern nations, but with the modern Europeans also, both of Italy, Germany, France, and England. It is unimportant that in Europe the improvement of these manufactures has, until of late years, been dependent on the patronage and assistance of princes, since, at the period of the first impulse to excellence, this was largely the case with all works of costly production. It is sufficient to notice that the pottery faithfully reflects the taste of the time ; that its improved manufacture and decoration has been coincident with general culture ; and that the style and progress of art, its motive and object, are as vividly depicted on the pottery as in the pictures and statues of the age. Thus when pagan subjects began to be treated among the artists of Italy, from the revival of learning and the spread of a knowledge of the literature of Greece and Rome, this change was immediately stamped as indelibly on the pottery of Urbino as upon the pictures of Raphael and his galaxy of pupils. In the same way, when the luxurious court of Louis XV. became interested in the manufacture of porcelain, and encouraged it with royal munificence in the workshops of Sèvres, all the glare and glitter of that luxurious court, its debased art and theatrical prettiness, were at once impressed upon the works of that manufactory.

In this view of the ceramic arts there is much that is hopeful in their present position, since not only is there a manifest progress in the last few years in the general manufacture of porcelain and pottery, both at home and abroad, but a

decided improvement in their decoration. We seem to have nearly passed through the stage of mere imitation; the antique has been carefully studied, not so much with a view to the mere reproduction of the elegant forms of its utensils and of their decoration (too much the custom during the latter end of the last and the commencement of the present century), as, from the examination of the vases and tazzas of antiquity, to obtain the geometrical bases of their construction, and the principles on which the Greeks applied ornament to their surface. Hence has resulted an improved elegance and refinement in modern porcelain; and the beautiful details of Moresque ornament, or the richness and elegance of the Renaissance, have been adapted to its decoration on the same just principles that guided the artists of Greece and Etruria in ornamenting with their own national and significant ornaments the beautiful works which time has spared for our admiration.

The designs for porcelain or pottery are few in number and of small importance; they are, moreover, the works of students, and in the present Report need not be adverted to. The works exhibited it will be desirable to class for consideration under two heads, generally broadly distinguishable, without, however, having special reference to peculiarities of manufacture or of material, whether as hard or soft paste, as earthenware and porcelain, since these will have proper attention in the Report of Class XXVII. They may fairly be divided into ornaments and works of utility. It has elsewhere been said that manufactures may be so over-decorated as to be degraded into mere *ornaments*; yet when works are produced simply with that object, they may not only be admired as addressed to the purpose of giving pleasure by their beauty, but by their production they often sensibly exercise a useful influence on the general taste of the manufacture. This is nowhere more evident than in the beautiful and valuable collection of porcelain exhibited in the Sèvres Court, the products of that celebrated manufactory. There is not a more interesting department in the whole Exhibition, nor one which more fully illustrates the wisdom of a judicious application of the *best* art to manufacture. Here we find the taste of the first artists assisted by the science of able chemists, and, under a judicious direction, united to the most skilful workmanship and manufacture, and the result is that the fabrication of porcelain is carried to the highest state of excellence. The greatest part of the display, however, consists of works which must be classed as *ornaments*, such as vases, caskets, chalices, tazzas, &c. The forms adopted are pure, and those pure forms rarely interfered with by the reliefs. The details of the decoration, the modelling of the reliefs, and the painting,—whether these consist of figures, flowers, or simply of ornamental forms,—are of rare and felicitous excellence in many cases, and of high merit in all. The finished perfection of these choice works must have exercised a great influence on the other manufactures of the country, not only by forming a band of workmen educated to perceive excellence as well as to produce it, and capable of giving assistance in many other branches of manufacture, but by their effect on the general cultivation of the public taste. Nor do such establishments benefit the country that supports them alone, they diffuse taste abroad, even into other lands. Thus the improvement of our own general manufacture of china has already been adverted to, and yet it is but justice to say that it owes much to the labours of the national establishments both of Sèvres and Dresden;

not only that their works have in some cases served as our examples, or guided our manufacturers by the principles of their decorative treatments, but from the stimulus to improvement which has resulted from the contemplation of rare works, and of that perfection which arises from a manufacture occupying itself rather upon efforts of skill than upon general production, and able to employ itself upon them irrespective of expense and regardless of cost.

Yet the danger of producing mere ornaments is fully illustrated even in china ware; more particularly in the works of the Royal Dresden Manufactory, since, as far as is shown in this Exhibition, the porcelain manufactured therein would seem never to have got beyond this result. The works have none of that purity of form which almost of necessity arises out of constructive utility; the reliefs, governed solely by the imitation of natural objects, and not by the requirements of use or the rules of art, are quite unsuited to the material; and the colour has none of that judicious subordination to the effect of the whole which is seen in many of the productions from Sèvres. The surface is often covered with purely imitative flowers in high relief, glowing and brilliant as the tints of nature, yet looking gaudy as ornament, and, from their filmy projections, liable to injury with every touch, and their preservation a source of constant anxiety to the possessor. Even the May-flower pattern,—a production of great beauty, on the principle of a diaper of form and colour,—from its minute hollows, is quite incapable of being cleansed, and from the thickness which it adds to the form, contradicts the true effect of porcelain, which should unite lightness with capacity. Imitation seems to rule, and not ornamentation. It may be, and no doubt is, difficult to form a tree with all its flowers and foliage out of porcelain, but nothing is arrived at when this is effected; it certainly has no utility, it is not ornament, and the more truly imitative it is rendered, the less it would be regarded, unless our attention was specially called to it as a wonderfully difficult effort of labour.

Altogether, a rococo air pervades the porcelain from Dresden; partly resulting from the style which was in vogue when the manufacture was at its zenith there, and largely from the production of works merely ornamental, from which it obtained so large a share of its celebrity. It still clings to the contorted constructive forms and extravagant prettiness of the style of Louis XV., which have been almost entirely laid aside in the establishment at Sèvres; antique shapes, with a more classical style of decoration, having supplied their place.

Among the most beautiful works in the Sèvres Court are the elegant *tazzas*, covered with moresque ornament in green and gold, and in blue and gold, on the natural white ground of the material. The two vases in unglazed *bisque*, decorated with figure subjects, painted by M. Roussel, after the designs of M. Amory Duval, are chaste and beautiful specimens, the colour being carefully subdued, so as to harmonize with the delicacy of the form of the vases. The Labour Vase, by M. Klagmann, sculptor, is a good example of figures in relief as ornament, so applied as not to interfere with the general lines of the form. It is a vase of large size in white *bisque*, very artistically designed and modelled, and is an evidence of many difficulties of manufacture, arising from its size, skilfully overcome. A casket enamelled with white figures on a blue ground, the work of M. Haman, is also an example of great beauty. When we consider the choice

paintings on porcelain and in enamel executed at Sèvres, not only from the old masters and others, but original works also, we shall be sensible of the great impression they must produce on the workmen, and the emulous efforts of manufacturing skill they must call forth. The figure paintings of Ducluzeau, Thurgot, Beranger, Laurent, and others, with the flower-pieces of Jacobber, Schildt, &c., must be allowed to have exerted this influence in a high degree. In our own country we have skilful enamellers, as may be seen in the exhibition of such works in the Fine Art Court; but those artists are not connected with the potteries, nor employed by the manufacturers; in fact, their art is too costly for such uses, unless where, as in France, a nation pays for that which is of great value for a nation's improvement.

The skilled French artists who have been enumerated are the successors of a line of others, who for nearly a century have laboured to improve the manufacture of porcelain, aided by a band of workmen, trained in the same school, to assist them in their efforts—with what eminent success has been sufficiently shown. In England our china painters are not artists, and but few of them seem to have artists' feelings, nor until of late years have they had opportunity of gaining the necessary instruction. The painters on china copy fruit, foliage, and flowers well, but when such labours are original they too often consist of but slight variations of some stock and stereotyped forms and colours, which the workman uses over and over again, without novelty either in grouping or drawing. In the power of painting the human figure they are mostly deficient, and few of them are able to execute subjects of which flesh forms a part. The modellers also have been sadly deficient in knowledge of the figure and of its anatomical details. In both these particulars, however, they are slowly improving, and the introduction of parian and other materials for statuettes, which is beginning to form a large branch of business in the potteries, and which as yet is nearly peculiar to England, has been of service in showing them their defects and in urging them to amend them. The Schools of Design established in the potteries, in which some of the principal manufacturers take an earnest interest, have already produced some results, and, energetically supported, will no doubt be of essential value to the workman and to the manufacturer. This is abundantly evident in the statuettes exhibited by Messrs. COPELAND and Mr. MINTON, as well as many other British manufacturers. These statuettes, often reductions from the works of eminent sculptors, are completed far more successfully than would have been possible a few years ago; and when we consider the difficulty of putting them together by properly and skilfully adjusting the parts after they come forth from the moulds, and the further care required from their extreme shrinking in the firing, many of them may be regarded as highly successful results. Still there is room for improvement; the *completion*, in the details of the joints, features, and extremities, is not quite equal to some of the *bisque* figures that have been produced at Sèvres; and it is yet a desideratum (which may, however, arise from the spread of statuary porcelain) to unite in one person the artist and the workman, as in the case of the bronzists of France, as well as many of the foreign workers in the precious metals.

The royal manufactories of Berlin and Bavaria have avoided many errors prevalent in the china ware of Dresden, and have rather followed classic models.

The works exhibited, however, are deficient in originality; the vases are of the most common classic forms—overloaded with ornament, and having landscapes and pictures painted in compartments on their surface. The Dresden enamel-painters on china rank next to those of France; and Bucher and Walther, in their copies of paintings by the old masters, evince a perfect knowledge of their art. Taprema, in Russia, and Nigg, in Austria, exhibit skilful enamels on china; but the porcelain from these countries has no peculiar originality or excellence to recommend it.

In considering the question of design as applied to that division of pottery and porcelain which more especially comprises works of utility, constructive form should have the first attention; and in such works as are intended for vessels of capacity those forms should be adopted which, while they are most elegant, are best fitted for containing or holding. Such articles, moreover, being of continuous use, the power of ready cleansing is of great importance, and should have due attention from the designer. It is to be remembered, also, that the means of receiving that which is to be contained is as necessary as its ready outpouring; since it is hardly desirable to have to apply a funnel to fill a pitcher or jug intended for constant use, although this may be permitted in a bottle which is required to keep its contents cool, or to be carried about, and subject to spill them by jolting, and therefore needing a smaller aperture. Moreover, a jug, or pitcher, which will admit the hand to cleanse it thoroughly, must be more suited to daily use than one which will not. A due consideration of utility would regulate the form in many other cases; as, for instance, in cups and other drinking vessels it might be most graceful to curve the top edge outward, but, since such a form is likely to overflow the person in drinking, however superior in elegance, it should not be adopted. When utility is considered before ornament, numerous truths of the like kind will be arrived at, which are entirely overlooked when the order is reversed; thus relief, when used, should be extremely low, and without indented hollows in the composition, as well as without undercuttings, in order to give facility for cleansing; but, while this is required for utility it is necessary for elegance and beauty also: the Greeks were fully aware of it as an important truth, and in their pottery abstained from reliefs, or kept them to the lowest impost: the vases of Etruria have generally their line unbroken by the ornament, and the reliefs on the celebrated Portland vase are so extremely low as entirely to preserve its outline. In the same spirit our great Flaxman worked to improve this fabric, as may be seen in the examples exhibited by Messrs. Wedgwood; the style being still a tradition in their works. The eastern nations are sensible of the same truth, and their decoration



of pottery is on this principle, being entirely subservient to the lines of the form. The antique Chinese vase for cut flowers, exhibited by Mr. ALCOCK, and engraved on the margin (p. 1645), will illustrate this, as well as the fitness of form to use. The neck narrow at the bottom, whereby the stalks would be compressed and supported; the enlarged bulb, to contain sufficient water for their nourishment, and at the same time to serve as a boss for the hand to grasp, is of a piece with the proper consideration of the decoration. This is not painted, but is of the nature of an inlay, being *doissonné* enamelled over the whole surface; that is, the enamel colours are filled into a coffer of metal standing on edge around the ornamental forms, the line of the vase being carefully preserved.

The application of handles is another important point connected with constructive design. The easiest and most convenient means of lifting the weight, when lifting only is required, and of lifting and pouring when both are requisite, being the question to be determined. Too often this is arrived at more by chance than by calculation. We see, for instance, the form of an Etruscan vase, such as is shown in figure 1, adopted as a pitcher; the original having two



handles, formed for its occasional removal only; for its new purpose, a spout is substituted for one of the handles; perhaps it is to serve as a ewer, requiring raising and reversing at every effort to pour, and yet, so changed, it is acted upon by the hand and wrist at the greatest possible disadvantage, the hand having to lift the weight, as it were, at the end of a long lever, and reverse it by the power of the wrists, as is shown at *a* (fig. 2), while a much less power applied at *b* (fig. 2 and 3) would suffice to reverse the pitcher and pour forth the fluid. The height of the handle is of less importance when the contents have to be delivered from near the bottom, as in the eastern form at fig. 4; since the slightest tilt of the vessel would begin to empty the contents through the spout, which would not be the case if they had to be discharged from the top. These hints will serve to show how important the proper consideration of the insertion of the handles is in such works, and how errors arise from merely adopting inconsiderately a form fitted for one use for another purpose. It would carry the subject too far to increase examples, but these suggestions followed out would lead to multiplied instances of false adaptation, and may serve to induce a more careful consideration of the subject. In the application of colour to porcelain and earthenware, the surface never should be wholly, or, indeed, largely covered; the material has a purity that should be decorated, not obscured. A due consideration of this simple rule would condemn a vast amount of bad taste, such as

completely metallizing the surface of china by gilding, changing china into imitative marble, or covering the field of many utensils with pictures, landscapes, or flowers. The Greeks decorated their pottery in bands, introduced to mark the change of curve, or to separate the various surfaces: the eastern pottery is in the same way decorated in bands, or, where the surface is more covered, it is merely with a diaper, which leaves the material sufficiently visible.

Landscapes and pictures are almost always out of place in pottery, and it certainly is objectionable to cover the centres of plates and dishes with pictures and views; not only because it hides the surface, which it has been before said it is desirable to retain, but because utility would be better served by the absence of any decoration in the part which receives the viands, to satisfy that sense of cleanliness only to be obtained by the white unchanged surface of the material.

There is still another subject to be referred to, which consists in the imitation of the ornament peculiar to one age and one purpose on the utensils of another age, and which are intended for totally different uses; or applying the ornament of one material to the decoration of another, which last fault, in speaking of other manufactures, has already been often strongly animadverted upon. The revivals of Wedgwood were, in a degree, in this spirit; and although they produced a vast change for the better in the forms of our pottery, and placed a salutary curb on the extravagance of the style that then obtained, they were but the resurrection of a dead art; and the funeral urns of Etruria, being inconsistent with modern uses, have a cold formality quite in consonance with the feelings of the time. An attempted manufacture of these vases, decorated with the beautiful outlines of Flaxman, of which a large number are exhibited by another house, can have only partial favour, as they can serve no other purpose than as ornaments, and will never enlist the sympathies of the general public in their favour.

The abuse of the ornament of other materials to unsuitable purposes is shown in many ways in this fabric; among others, in copying engravings and pictures on to various utensils. In one case the most sacred symbols of religion serve as decoration for the borders of plates, while the centres of them, and of the dishes of the same set, consist of angels, copied from an illustrated prayer-book, flying in the midst of a blue heaven diapered with stars. Such incongruities, improper in any case, are sadly and strangely inapplicable to a dinner-service. It has been well said, that "symbolical ornament demands perfect accordance between the use of an object and its decoration;" but can anything be more inharmonious than such sacred symbols mixed up with a festive dinner? Such incongruities are ever arising from unthinking imitation.

When, however, due allowance has been made for faults, failures, and shortcomings, it is impossible not to feel that the general manufacture of china has made great progress in this country. There is a greater selection of pure forms—a less gaudy treatment of the whole surface—than heretofore; and where works are founded on past styles, their most meritorious qualities are selected, their faults rather avoided, whilst the power of the art-workman has visibly increased. Thus, in the beautiful dessert-service from the manufactory of Mr. Minton, whilst there is much that is derived from old Sèvres patterns, it has been by judicious adoption, rather than imitation. If the figures are a little crowded, they will be found exceedingly well modelled; and the purity of their white

material, contrasted with the delicate hues of the colours combined with it, has a chaste effect, the furthest possible removed from gaudiness. Indeed, the great merit of the works from this manufactory is the restrained use of colour, and the general delicacy of the decoration. Some of the small figures on the centres of the plates are excellent specimens of the china-painter's art, and there is almost a total abstinence from landscape, or mere pictorial subjects, on these utensils. As to the imitative renderings of flowers on china, it is hard in this case to object to their want of conformity to principle, since the beauty and purity of the surface of china is so suitable to such art, that here, if anywhere, their use may be overlooked. The porcelain both of Messrs. Copeland and Messrs. Rose holds a high place also for form and colour; and some of the most successful of the larger efforts at enamel-painting on china in England are exhibited by the artists in the employ of these manufacturers, as well as some excellently-finished statuettes. The application of porcelain to decorate the jambs of fire-grates has produced some well-designed slabs from both Messrs. Copeland and Messrs. Minton; although, perhaps, one of the best designed of such works, with certainly some of the best English flesh painting, is to be found in some jambs attached to a grate exhibited by Messrs. Stuart and Smith. An application of the design of some jewelled embroidery from the work of Mr. C. J. Richardson, to ornament a flask, exhibited by Messrs. Copeland, gives a rich treatment, although contrary to the sound principle of not covering up the surface of the material too entirely; but in another specimen exhibited, the whole merit of the adoption has been lost by introducing a landscape amid the lines of the form, making it appear how much chance, and how little principle, has governed the choice. One or two plates in Mr. Copeland's collection have great merit in their design, the width of the ornamental margin being well considered and the centres judiciously plain.

The general manufacture of pottery in France includes some artistic adaptations of design to brown stone-ware, and of colour to its surface. The collection is exhibited by M. Mansard (France, No. 1342). Although belonging too entirely to the class of *ornaments*, and objectionable from the false relief sometimes adopted, the application of art of a superior kind to common materials deserves much praise, and is worthy of attention, as showing how much might be done by a like attention to the manufactures of such wares at Lambeth and Fulham. Of the Palissy ware exhibited, little can be said in this Report; for although evincing much skill, it is so entirely opposed to all utility, and even beauty, and so completely a work of mere curiosity, that the difficulties overcome do not redeem it. The true Palissy ware did not consist of such unmeaning reliefs as are here applied to plates and dishes. The porcelain exhibited by M. Lahoché (France, No. 1287) contains some plates of meritorious design, as well as one or two elegant tazzae. In Bavaria some plates, designed by Kaulbach, are very judicious in the treatment of their ornamental borders; although the pictures from Reynard the Fox, painted on their centres, must be objected to. Some jugs, designed in the old German style, are pleasing from their varied surface.

GLASS.

Among the many beautiful materials which the earth has yielded to the industry of man, to add to his comforts and increase his enjoyments, glass holds a prominent place. If we regard its use in the fabrication of utensils to contain the fluid portions of our food, it is most especially valuable, since its surface has the power of resisting the action of almost all liquids, and, as a material, it unites strength with extreme lightness and great capacity. Its perfect transparency is another rare quality, whereby the purity and clearness of the liquid it may serve to contain is immediately manifest, enabling the satisfied eye to minister indirectly to the pleasures of taste. Moreover, whilst it is one of the most cleanly materials, from its extreme smoothness and hardness of surface, it is also most easily purified, and its pristine brilliancy is restored by the smallest possible effort of labour. Besides all these varied qualities, the materials of which it is composed are of the least costly kind, and the processes of its manufacture extremely simple; so that it is fitted for general use, and within the means even of the poorest purchasers.

For the purposes and utensils above enumerated, the qualities ascribed to it, properly understood and duly considered, will lead to a discovery of the principles which should govern its design and decoration. Of these, the foremost are its brilliancy of surface and its transparency, both of which should ever be preserved with the greatest care in all right treatments of glass. And yet, strange to say, these qualities are not only often disregarded, but there is a strong tendency to contradict and destroy them: thus we see wine-glasses and decanters, water-bottles, caraffes, and drinking-vessels of many kinds, not only with the surface covered with ground ornament, but sometimes wholly and entirely changed and obscured by grinding, so as to render them perfectly opaque: or, we have colour most injuriously applied to destroy purity, and prevent a proper enjoyment of the glowing lustre of the liquid contents; whilst sometimes the material is wholly or partially opalized; in the one case making it into a spurious porcelain, in the other into a species of japanned hardware, without the toughness and tenacity of that manufacture. Another excellence of glass is its lightness, as compared with its power of containing: the maintenance of this quality is opposed to the heavy and deep surface-cutting to which glass is now so frequently submitted, especially in water-jugs and decanters, and in the pieces of dessert-services. This cutting is intended to enhance the jewel-like and prismatic effect of glass, but it is opposed to its true qualities for such purposes, and should only be resorted to in handles, stems, or bases, where transparency is unimportant, where constructive thickness is necessary, and the grasp in holding may be aided by the facets of the surface. Yet it has been the fashion to carry this practice of cutting to an extreme, tending to vulgarize, as far as possible, the simple and beautiful material: in some of the works exhibited it has been applied even to the bowls of wine-glasses.

The more simple mode of manufacturing glass is productive not only of the most beautiful shapes, but of its best qualities: and blown glass unites thinness, translucency, and pure surface, to forms which combine the greatest symmetry with varied curves; that is, the sphere, resulting from the circular motion of the

workman's instrument, elongated by the breath and weight, into the ellipse and its combinations. These blown forms may be ornamented by narrow bands of engraved ornament, of which flatness and symmetrical distribution are requisite qualities: in wine-glasses and drinking vessels it ought to be reserved for those parts of the bowl which do not interfere with a perfect sight of their contents. Any gilding or enamelling can only be admissible under the same rules. In all cases, elegance of form should be the first consideration, to which cutting, gilding, or engraving should be entirely subordinate. The relation of the stem to the bowl in wine-glasses is another point of some importance. The practice has of late obtained of making them of such extreme tenuity as to produce a sense of fragility and insecurity, which is quite as great an error in taste as the contrary fault of heaviness and thickness.

Like porcelain, a section of the manufacture of glass is devoted to the production of what can scarcely be called by any other name than *ornaments*. But while the production of porcelain ornaments has been fostered by princes, and, through the clever artists attached to royal manufactories, has arrived at great beauty and rare excellence, reflecting back an improved taste on the design and decoration of the general manufacture, glass has not been favoured with such advantages; and the specimens of Bohemian and Hungarian glass in various parts of the Exhibition, notwithstanding the rare beauty of the materials of the manufacture, can hardly be instanced for the merit of their design. The mode of manufacture, by casting in clumsy masses in wood or metal moulds, and reducing by cutting with the wheel, is contrary to the best qualities of glass, which consist of lightness and elegance. This alone causes many of the faults of the manufacture; since the true characteristics of glass are lost, and are replaced by qualities too apt to degenerate into the meretricious and the gaudy. Thus transparency is merged in rich colour, and this, again, overlaid with gilding: or the surface is flashed with opal, cut away by grinding to the coloured under-surface; sometimes giving the appearance of porcelain, sometimes even that of the inferior manufacture, papier maché; whilst, occasionally, the whole surface is frosted by grinding, and tinted in crude colours, the appearance of glass being entirely lost, and only its worst quality, that of brittleness, remaining: whilst the forms adopted are often as inelegant and rude as they are unsuited to the material to which they are applied. The tall chandeliers exhibited among Count Harrach's glass are examples of these remarks; at first sight they resemble papier maché, from the excess of gilding on the dark ruby glass; and when examination determines them to be glass, the deeply-indented horizontal throatings of the mouldings of the shafts give a sense of dangerous insecurity and ill-adapted construction. This is far less seen in the smaller works of the same kind, but it is, nevertheless, the natural result of a wrong application of constructive forms to the material, and of an improper over-decoration of the surface: whilst it would appear that the true adaptation of such glass for the above purposes has not yet been obtained, its use in the manufacture of lamp pillars, knobs, and handles, lock furniture, and finger plates, has been more successful, and seems likely to be attended with more tasteful results.

When glass is used for large objects, such as chandeliers and candelabra, where construction is required, its known brittleness is rather at variance with

the constructive application of the material, and it seems in the principal branches and supports to require not only a hidden metallic structure, but even the appearance of it to the eye, to overcome a certain sense of insecurity.

In upright standing candelabra the work should arise out of some other material as a base, and it is exceedingly objectionable to base a glass superstructure on the same material, supported on foliated or other forms of the nature of feet. In hanging chandeliers a construction entirely of glass equally quarrels with the sense of security; the chandeliers of the last century illustrate the error of such constructions,—their long bent branches appear weak and brittle, and the full beauty of the glass is not brought out by the lighting; the present mode, which treats glass rather as a string of jewels assisting to hang up the branches, is more consistent with its true use and best qualities; for while in masses it constructs ill and has not its full brilliancy, lustre and prismatic beauty are obtained by loose pendant forms cut with proper facets, so that every motion, however slight, contributes to the splendour of the work by the varied reflections of the lights. In such works coloured glass should be introduced sparingly, and it should always be translucent, opalized coloured glass hardly ever having a judicious effect.

In referring to the exhibited works in the manufactured material, the first place is due to the glass fountain of Messrs. Osler. It is a matter of regret that a production so unique in this material should not be entitled to praise for its design; the truth is, that works of the like magnitude in glass never having been before attempted, and the designer being consequently thrown on his own resources, he should have seized the opportunity so offered, and, striving to forget what had been done in other departments, treated the material for itself alone, and consistently with its own proper requirements. Instead of this there is an attempt to mix architectural stone forms with others that have become almost conventional in glass, and the result is inconsistent and unsatisfactory. The glass pillars are far too slight for the heavy inverted canopy, and both those canopies are too large for the basins above, very inharmonious in their contrast of lines, and unfitted for the agreeable display of the water; the glitter of the jewel-formed ornaments with which they are covered being confused with the motion over them of the natural element, instead of serving to show out its brilliancy and clearness; indeed it is evident that the main source of error has been in supposing glass, and especially cut glass, a suitable material for a fountain; it is at once seen that this is not the case; instead of its being a proper foil for the sparkling water, glass emulates its sparkle and lustre, and the result is a failure from want of contrast.

The unsuitableness of glass, when on a large scale, for self-construction is also seen in this work, and is partly felt in the large and otherwise elegant candelabra exhibited by Messrs. Osler, the property of Her Majesty, especially in the horizontal indentations of the architectural moulding of the bases, which induce a sense of liability to break arising from the known brittleness of the material, as has been before alluded to in the works from Bohemia; in other respects they are in good proportion and beautiful in material, and the gilt bases on which they stand supply the want of a metal foundation before remarked on; the colourless quality of the glass is extremely beautiful. It is hardly possible

to estimate properly the effect of cut glass except under the influence of the light for which it is adapted, an influence which has been noticed even in the case of metal chandeliers, and which would be much more marked in its effects on the prismatic forms of glass; but loose pendant pieces attached together in long sweeping lines are well adapted for this purpose; and the general forms of such works as exhibited by Messrs. Osler, Messrs. Apsley Pellatt and Co., by Perry and Co., and others, are good, although they do not satisfy the mind as to construction, and sometimes appear to want simplicity. It has been necessary to diverge a little from the classification at the head of this section to take notice of the above works and others of the like character; in returning to the objects more especially included in this part of the Report, the table glass exhibited by Mr. J. G. Green (Class XXIV., No. 32) deserves especial notice, both from the general excellence of the forms, and from his large adherence to those principles which have been considered as best regulating the true use of this beautiful material. In his blown glass jugs, water-bottles, and wine-glasses, some of the purest forms derived from Greek utensils have been selected and adapted to the material and to present use; they are decorated with ground ornamental forms in bands, and, although the ornament is sometimes too redundant and dispersed, it is in the right direction. Many of the forms exhibited by Messrs. Pellatt, and by Messrs. Richardson of Stourbridge, have great merit, while the beautiful application of glass to door-handles, and the extreme purity of the material obtained by Messrs. Pellatt, of itself gives it a high ornamental character in such works. Messrs. R. Harris and Sons have some finger-plates in glass that point out a beautiful use of the material; one with a diaper in silver on a blue ground is chaste in effect and clever in its design. P. J. Lachoche, of Paris, exhibits some goblets and glasses of pure blown forms, simply ornamented and in good taste; but on the whole the best white glass, both in form and ornamentation, is to be found on the English side.

The design of the Bohemian glass, both of Count Harrach, the largest exhibitor, as well as of Messrs. Kolb, of Prague, and of other manufacturers, Foreign and English, is tending rather to injure than improve public taste from over decoration. The richness of the material, from the brilliant colours that may be produced in it, renders it liable to this fault, which is greatly increased by the gaudy extreme to which the ornamentation is carried, too often applied to coarse, unrefined, and inelegant forms.

WORKS IN THE PRECIOUS METALS.

The design and ornamentation of works wrought in the precious metals deserve especial attention in this Report, since in this department we may expect to find the highest *art* applied to the richest and most costly materials. Moreover, in such manufactures more than in any other the labours of the artist and the ornamentist seem to concur, and are often so intermixed that it is difficult to designate their several provinces, or to determine where art and ornament diverge from one another. Here we have a field wherein we may study the right application of each, and understand the due limit within which each is available for the purposes of manufacture.

However, in the highest range of his art, the ornamentist may be merged in the

artist, there is a distinct difference in the principles of the two arts, a difference which becomes more apparent as the ornamentist descends from labours of such high requirement to those more strictly within his own province. Art has its childhood in a careful imitation of nature, and grows into an abstract imitation or generalization of nature's highest beauties and rarest excellences—still, however, imitatively rendered—and nature, thus selected, becomes the vehicle for impressing men with the thoughts, the passions, and the feelings which fill the imaginative mind of the artist. The generalized imitation of nature is the language in which these imaginative abstractions are embodied and expressed, and this whether the artist be sculptor or painter; the landscape painter even proceeds on the same principles, and endeavours by a selected *imitation* to reproduce the aspects of nature in harmony with certain feelings which fill his mind, and which he wishes to impress on the mind of others. In its lower phases art relies more and more on imitation, seeking to give pleasure only by the reproduction of beautiful objects or beautiful combinations, until, in its lowest development, art, if it can be so called, rests contented with mere *imitation*.

In considering in a like manner the scope of the *ornamentist*, it will be evident that in his highest aims he is assimilated to the *artist*, so that it becomes extremely difficult, nay impossible, to separate them, or draw any line of distinction between the one and the other. Thus the beautiful shield which embodies the description given by Homer of that of Achilles, designed by Flaxman, and exhibited in electrotype in the Fine Arts Court, and that skilful specimen of embossed work, the shield by Antoine Vechte, in the collection of Messrs. Hunt and Roskell (Class XXI., No. 97), are at one and the same time works of art and works of ornament. From this high range the occupation of the ornamentist descends by imperceptible degrees; not as in the case of the artist through the more and more close *imitation* of nature, but by selecting from her whatever is beautiful and graceful, irrespective of her individual embodiment of these qualities, and adapting them to give pleasure separately and apart even from any wish to recal the objects themselves from which he has sought or obtained them; his effort is to give the most characteristic embodiment of those natural objects (viewed in relation to some peculiar quality, form, or colour, or some particular adaptation required), rather than to imitate; indeed he departs more and more from *imitation* as he diverges from the path of the artist to occupy his own separate province as an ornamentist. These are truths to be continually borne in mind, as they constitute the only cure for that false style of ornament so largely pervading the manufactures of the day, and already so frequently alluded to under the name of *naturalism*, consisting of the mere *imitative* rendering of natural forms as ornament, and which is nowhere more largely exhibited than in works in the precious metals, and in the affiliated manufacture of plated and Sheffield wares.

While it is not possible, therefore, in works in the precious metals, entirely to separate the artist from the ornamentist, still for the purposes of description their separation is marked with sufficient distinctness. A great cause of the faults exhibited in these works seems to be, that they have received their design rather from the artist than the ornamentist; thus we have figures having no constructive connexion with the work ornamented, but rather of the nature of statuettes perched wherever a ledge or shelf offers accommodation for them: these are

generally as *imitatively* treated as the material used and the powers of the artist permit, and are applied to inkstands, candelabra, and works of the like kind requiring a purely *ornamental* consideration. Many centre-pieces, racing-cups, and testimonials are treated merely as groups would be by the sculptor, although the lowest style of his art has but too frequently been adopted, and imitations of textures, chain and plate mail, and such laborious littlenesses, made a point of, rather than that nobler view of art, which, discarding miniature and strictly imitative details, seeks by grandeur of form and largeness of manner to make us forget the scale of the work in the dignified style of its treatment. Now, if it is proper that these works should be consigned to the hands of the artist, he is bound to treat them according to the laws of his own art, not only by a noble style but also by making them as groups truly statuesque, combining the parts so that they form an agreeable whole in all possible directions of view. Above all, the *thoughts* which, as works of *art*, they serve to embody, should be such as are worthy of being illustrated on metals of great value, which enriched by true art are enhanced in worth a hundredfold.

If we contemplate some of the inventions of the artists, and some of the thoughts which they have wrought out, we shall be indeed surprised that such puerilities could be dwelt on long enough to execute them as works of art, and still more that manufacturers, so shrewd as they generally are, should be found to engage in their production, were it not sufficiently evident that there is a large and wealthy public whose taste does not rise above such *art*, proved by its becoming patrons and purchasers. What can justify the employment of the precious metals, and what ought to be the more precious labours of artists, upon huntmen and ploughboys, to render them with all the coarseness of their garments and the texture of their hose? or who, but the givers of a testimonial, relying on the known taste of its receiver, would require art to be degraded into the mere imitation of a hedge-row occurrence on a hunting-day when the sport was successful; knee-breeches and top-boots being as important items in the groups as the hounds, horses, and the portraits of the individuals whose goodfellowship it commemorates? It is such art in the more precious metals, employed on such thoughts, that leads, in the imitative manufactures, to the many paltry inventions which are found to prevail therein. Rachel at a well in a rock under an imitative palm-tree draws—not water, but ink: Burns' shepherdess would find the same black fluid in the formless well by her side; a grotto of oyster-shells with children beside it contains, not a light, but an ink-vessel; the milk-pail on a maiden's head contains, not goat's milk, as the animal by her side would lead you to suppose, but a taper. Such works are akin to *épergnes* with the hippopotamus and his keeper; or Paul and Virginia under a palm-tree that upholds the glass for flowers on its top; or Apollo dancing, supporting at the same time a glass *épergne* twice his own size; and inventions of equal or greater *novelty* wrought out with great waste of skill and labour. Even when we arrive at really artistic works in this style, of which happily there are many, it is more than doubtful whether the ornamentist would not be more suitably employed upon them, and an ornamental and architectural construction first obtained, ere art was called in to aid in their completion. It is not pleasant to add, that the above strictures more especially refer to English productions. It is true that such works have

often a local significance or an individual importance, causing their exhibition here, and making it less likely such should be exhibited by the foreigner than plate of a specific use, or ornamental works whose characteristics are more general ; but it is impossible to deny that the taste of the class who purchase or commission these works abroad must be higher than our own.

In France, for instance, we find testimonials and prizes taking the shape of art rather than of massive metal. The President of the Republic, in contributing a prize to the winner of the Chantilly races, presents a shield, on which are four reliefs, illustrating racing in various ages of the world ; and when the *workmen* of Montlucon and the inhabitants of Lot desire severally to present testimonials to Generals Changarnier and Cavaignac, the weight of silver is of far less importance in their eyes than the rare beauty of the art-workmanship. These works are exhibited by M. Froment Meurice ; and the two latter, two beautiful swords, are choice examples of design and chasing. Moreover, it is worthy of notice that in such works the artist does not consider his vocation a separate one, but regards the utility while he perfects the art. In both the above sword-hilts, the ornament (groups of figures) has been so thoroughly adapted and composed for its purpose as a handle, that it is perfectly accommodated to the grasp ; which is the case also with a beautiful short sword, ornamented with the history of St. Hubert, executed by M. Marcet, and exhibited by Marrel Brothers (France, No. 331) in the same department.

When the amount of those works exhibited by the gold and silver smiths of Great Britain is regarded, an amount whose value is to be estimated by its weight in *tons*, it must be owned that there seems ample encouragement for more skilled labour ; but the slightest glance will serve to show how largely the mere weight of metal enters into the estimate of value by the possessors of plate here ; and, on the contrary, how little fine art is considered to add to its worth. And yet art would give a more real and permanent value than mere material, and tend at the same time to separate the precious metals from the plated substitutes which ape their richness, but which would never engage the hand of the artist in such rare and costly efforts of skill ; indeed, it is a curious fact, observable in the imitative manufactures, more especially in those where the production is very easy, and the sale likely to be extended from the cheapness this induces, that, instead of being employed on art, of the best character, in the first type, it is often of the most wretched description, notwithstanding one might suppose that the cost of the first model, even if high in itself, would be trifling dispersed over a multitude of copies ; but it is probable that the style of the work in such cases is suitable to the general taste of the purchaser. Thus the electrotype process, by which means the rarest specimens of art can be, and have been, reproduced, applied to general manufacture, or where original works have been attempted, has been too often used on the worst art and the most puerile ornament. The same is observable in works formed by stamping in dies, and even, though in a less degree, in those cast in moulds, and afterwards chased ; and it is only when the same man's mind invents the work that his hand executes, that the highest skill is seen conjoined with the most beautiful art.

It must be owned, however, that our countrymen are greatly deficient in the treatment of the precious metals as the medium of art. The truth seems to be

that here one artist designs the work, and perhaps makes the model, whilst another is employed to produce it in the metal. Thus we find works designed with great ability, and modelled with much knowledge, and evidently by artists of great professional excellence, yet these works are completed in the metal with every possible littleness of imitation, serving only to degrade and vulgarise the art it is employed upon; and this frequently is caused by the surface treatment and the mode of execution, wherein imitation has taken the place of art. Thus the true artist does not produce the texture of the fur of animals hair by hair, but gives its general expression by some conventional rendering, by the indications at the parts where the skin folds, or by tooling to emulate the lustre of its gloss. In the same way true art does not imitate the materials of our dress by the threads of its manufacture, but indicates them rather by the shape and contour of the foldings. Yet in the works under examination the surface is often subjected by the workman to a most laboured treatment, labour without knowledge, which dwells more upon hairs and threads, upon details and buttons, than on the form of a joint, or the bones of an extremity: the one is a labour that requires no exercise of thought, nothing but mere dexterity; the other requires a workman not only educated into a knowledge of the parts, but who can enter into the feeling and intentions of the designer. This dwelling with complacency on mere labour, and evident satisfaction with its tedious felicities, can only arise from the habit of giving the models of the superior artist into less skilful hands, to be completed in metal.

Again, in the higher works in silver the foreign artist has had the boldness to regard the material, rich and costly as it is, merely as the vehicle of the art he adds to it; and that lustre and brilliancy, which is one of the great excellences of the rarer metals, he subdues by acids to prevent the glare from interfering with the forms of art. To the eye, silver, so treated, might be so much zinc, did not the informing mind and the beautiful art enshrined in it at once bespeak the valuable metal which alone is capable of rendering such a noble return to the artist's labours. The metal so used serves only to display the art; but our workers in the precious metals have not yet arrived at such a state of virtue; the value of the mere silver is too great in the eyes of the public to be given up, and the full glitter of its polish must be sought to satisfy their feeling of cost and magnificence. From the same cause it is, no doubt, that figures, well designed and artistically modelled, are loaded with toolings and burnishings, are matted and frosted, and every other expedient attempted, to show the silver rather than to exhibit the art.

Another defect of the works in the precious metals, as exhibited on the English side, may be traced to the same cause—the separation of the work of the artist and the silver workman: hence casting and chasing are the means of production here, whilst the foreign artist himself uses the hammer and the punch, and beats out with his own hand the creations of his fancy or the inventions of his skill. Casting and chasing in their proper application are means only of producing and perfecting a thing, after the design and model have been executed: even in the hands of the artist himself they are but completing and perfecting processes; the work, as far as invention goes, is already done before it is committed to the mould; and the chaser does but perfect what the caster has produced, with the

more or less excellence, according to the art-knowledge which he possesses; but by the embossing process, called *repoussé*, the artist himself produces the work by punching the plate of silver on a soft matrix, and continually annealing it in the course of his labours. By this embossing process the mind of the artist is working with every stroke of the craftsman's hammer; and not only does his own hand work out every characteristic quality of the surface, whether of flesh or of drapery, and his knowledge supply every essential detail, but thoughts seem to arise out of the very method and means of working, and each stroke on the punch may prove a suggestion leading to new fancies, or be followed out into more happy details. Even from the accidents of annealing—constantly necessary during the work—the colouring of the metal in the furnace calls up new thoughts, like those which arise in the mind of the poet watching the glowing embers, and the artist at once embodies his new-found fancies. Chasing has none of these suggestions; as before said, it only perfects: whilst embossing is to it what etching in the hands of the painter is to engraving. The very means in the one are suggestive in every stage of the progress; while the other is only a more or less complete copy of a previously designed original. The beautiful and skilful works of Antoine Vechte, both the shield before alluded to and the vase representing the story of the Titans which accompanies it, with the beautiful centrepiece wrought in silver partly by the same process, the work of Wagner, exhibited at the entrance of the Court of the Zollverein, are rare specimens of this mode of working, and its suggestiveness will be at once understood by those who are at the pains to examine them, since they all three have parts only partially finished, such parts remaining as it were in the state of sketches, and speaking in this state so strongly to the inventive fancy of the artist, that he who looks into them feels a strong desire to work out the thoughts and fancies they cause to crowd upon him. The iron shields exhibited by Le Page Moutier are also fine examples. This mode of workmanship tends also to a unity between the ornaments and the objects ornamented, whilst chased work and cast figures, too often necessarily wrought apart, and applied to the group or thing ornamented, have oftentimes a contrary tendency. In reviewing the question of works in the precious metals, there seems a coarseness and florid style pervading English works, showing itself in groups "in the round" in imitative art, in bold and overcharged relief, in coarse ornamentation, and in enlarged scale; whilst in France, the only other large exhibitor, and in the works of Wagner in Germany, and of certain French artists on the English side, there is much less of this grandiose coarseness, particularly in art not specially devoted to purposes of manufacture. At the same time they have, perhaps, in some cases rather too much ignored the consideration of the material, and treated it entirely as a medium for the art. This was not the case with the mediæval goldsmiths, or with those of the 16th century, who, whilst adding exquisite art to rich materials, so treated the general surface as to obtain at the same time the richness and lustre of the precious metals. One thing that we neglect, however, which our French neighbours do not, is the use of enamels; and the varied treatments of surface by oxidizing, parcels-gilding, burnishing, niello, &c.

The use of enamelling as an ornamental addition to the surface of the precious metals has been confined, with one or two exceptions, to chalices, patens, reli-

quaries, and other ecclesiastical goldsmiths' work, founded on ancient and mediæval examples; and there are some good specimens of Champlevé enamelling in the collection sent by Mr. Hardman, as well as in the works of Keith and Skidmore, and in France in those exhibited by M. Poussielgue-Ransand; but the most artistic examples of the use of enamelling are in the elegant mountings of rock crystal, agate, and lapis-lazuli, as cups and flagons, by Mr. Morel, of Burlington-street, which, for felicitous design and beauty of execution, equal the rare examples of the 16th century. It is understood, however, that these are the works of a French artist. Mr. Weishaupt, of Hanau, in the tastefully designed chessboard which he exhibits, has also made an artistic use of surface enamelling, both in the dresses of the chessmen and the ornament of the table; while the choicest specimen of the combination of many materials to form a rich and beautiful work is seen in the shield of Faith, presented by His Majesty the King of Prussia to his godson, the Prince of Wales; it was designed by Cornelius and Stüler, and executed by Hossauer, Fischer, and Mertens; and is rich, without the slightest tendency to excess. The subjects, from the Scriptures, in silver, are ably executed in low relief, and carefully chased; the single figures of the apostles beautifully designed, as are the accompanying enamel. The ivory forms that frame in the compositions towards the centre, and surround the outermost rim of the shield, not being continued through the compositions of the outer margin, there is a slight appearance of its wanting constructive framing in that part, and there are three different scales of figures in the compositions. With these slight exceptions, it is both a beautiful work of art and a rare example of the skilful combination of precious materials, as well as of unity of intention in the whole composition.

The natives of India have long been skilled in the art of enamelling both on metals and for jewellery: the works exhibited in the cases of the East India Company contain many interesting specimens of this art—both applied to the surface of domestic utensils, as flagons, cups, &c., and to necklaces, bangles, and articles for personal adornment; the portion of a dagger-case given in Figure I., Plate 3, is beautifully ornamented with enamelling, and is not only a choice example of the art, but of the Indian treatment of flowers as ornament. An enamelled incense-burner of large size, and the flower-vase inserted in the remarks on pottery (page 1645), both from China, and exhibited by Mr. Alcock, are beautiful and choice productions in this art.

If we can allow such works as testimonials, racing-cups, centre-pieces, and others of the like character, to be given up to the treatment of the artist, there is still a large number of other articles in the precious metals and their representatives having a defined purpose as utensils, and strictly devoted to a use, which must belong to the domain of the ornamental designer, and be subject to all the laws of his art. Of these, utility should be the first consideration. They should be composed on geometrical forms and have a symmetrical construction. Capacity and mobility, in most cases, will have to be regarded, in connexion with proper stability and solidity; and it should be remembered that, as domestic *utensils*, they are not to be placed under glass shades, and therefore will require constant cleansing and polishing, and that, not at the hands of the silversmith, but of the butler or his assistant. This alone ought greatly to regulate the treatment of surface, which

should be such as will best display the beauties of the metal, and yet not render it liable to injury under such cleansing. Then again it is usual to make the handles and knobs points of ornamentation, and this not improperly; but it should not be forgotten that they are to be grasped for lifting, and should be convenient for that purpose. And neither in these, nor, indeed, in any other part of the ornamentation, should the relief be so bold, or project so far, as to be liable to accident or entanglement in the use of the articles. Some of these remarks may seem almost uncalled for, but are not so: nor are the errors recited confined to English manufactures, but are equally evident in those of France. Thus it is impossible to justify large and florid groups of dead game, of fish, of fishing utensils, or the like imitative treatments, as the knobs of dish-covers, or the handles of tureens; however beautiful in design or excellently chased, they are not convenient for use; nor can the hand be safely brought in contact with the metallic toes of a pheasant, the tentacles of a lobster, or the twigs of a fish-basket, any more than stags with their branched antlers can well be laid hold of to remove a venison dish. Faults of this class chiefly arise from the natural or imitative treatment, which has to answer for so large a growth of errors.

It has before been remarked that the figures introduced into the ornament of metal-work are too often merely applied or stuck on, not arising out of the work as a constructed whole, and this more especially in those works which have been usually committed to the skill of the artist; but if not to be tolerated in those works, in objects of utility they are far more out of place, and *ornament* requires that figures should have an ornamental construction. It cannot be too often repeated, that imitative trees and foliage, flowers that are like the growth of the hothouse electrotyped, and which dangle and shake with every movement, as much almost as would their prototypes on their natural stems, are not ornament, are in the worst possible taste for any useful purpose, and have a flimsy and tinsel-like appearance, as much beneath the impressive effect in metal of even mere plain surface, as they are wide of any pretensions to fitness or propriety as works in metal at all. This naturalism is evidently a heresy of the artist's, and should have no quarter at the hands of the ornamental designer. In the section devoted to hardware, the treatment of metallic surface has already been the subject of remark; much of which will apply here also: but in connexion with this imitative art, it may be remarked that the frosting, which it renders almost necessary for its display, is even more opposed to the brilliancy of metal than that oxidation so useful in showing art treatment.

In jewellery, used for personal adornment, the fancy has full play, and the invention need be but slightly curbed by a consideration of use, such works being in their very intention ornaments; where precious stones are employed, the first object being to display them to the greatest advantage, the designer should be careful that neither gold nor enamel interferes with them, and that there is sufficient motion in the parts to bring the light into play on their surface. In mourning ornaments, bracelets, brooches, &c., M. Meurice has shown himself a skilful artist; here, indeed, the fancy of the French art-workmen has full scope, and in such smaller works in metal as cane-heads, seal-handles, buttons, snuff-boxes, &c., the most delicate workmanship is found combined with artist-like design and pleasing inventions, both by this exhibitor and in the articles displayed by Rudolphi

(France, No. 1465), Gueyton (France, No. 1619), and others. It only remains to remark upon some of the works for domestic use exhibited in this Class which have not already been spoken of or alluded to. One of the choicest works of utility is the tea-service of Eck and Durand (France, No. 1211), which deserves attention for the architectural arrangement of the whole as an harmonious composition, and for the beauty and elegance of the individual forms and their ornamental details; it is a thorough study of ornamentation; the figures, where introduced, are perfectly parts of the composition, and are oxidized to show the beautiful workmanship employed upon them; the ornament is in low relief over the surface generally, and parcels-gilding has been used to give expression where the treatment became confused by a little excess. The plateaus on which the cups, cream-vessels, &c., are arranged, are treated with ornament in niello, and every effort has been adopted to give variety to the surface without interfering with the general repose of the whole. Constructive use, moreover, has been well considered; the composition consists of a raised central urn, from which the water flows through several vents into four teapots arranged below, whilst chalices for sugar, cream-pots, &c., are grouped lower down in the arrangement, the bottom having spaces for the cups designated by circular groups of ornament in niello; the only difficulty is to conceive how so massive a piece of plate is to be filled at the top with hot water, and conveyed into the drawing-room, without discomposing its general arrangement: in addition to which, it certainly has the fault of being over ornamented, notwithstanding the great care that has been taken by low relief and otherwise to prevent such an appearance.

The work on the English side most nearly corresponds with the last-mentioned is the centrepiece, the property of His Royal Highness Prince Albert, exhibited by Messrs. Garrard; this also has been designed with a proper sense of architectural arrangement, and is elegant in its general forms, especially the central tazza, while the low relief ornament on its surface is well considered and in good style; being entirely treated in gold, it has a tendency to monotony, counteracted as far as possible by a very judicious use of hurnished surface. The portraits of animals introduced, although very cleverly modelled, do not harmonize with the general treatment. This collection contains also some well-designed salt-cellars, vegetable-dishes, and candlesticks, whilst even some works in the florid and nearly discarded style of Louis XIV. look almost satisfactory, compared with testimonials and racing-cups of the character before alluded to. Messrs. Hunt and Roskell's principal centre ornament and plateau exhibits some cleverly designed figures well modelled and with much appropriateness of subject, and it groups well as a composition. Many of the figures in the round, however, have too much the appearance of separate groups placed on the ornament and not forming part of it, a mode of treating such subjects which must be considered objectionable: this firm deserves great praise for exhibiting the shield and vase of M. A. Vechte. Messrs. Elkington's application of electrotyping to the reproduction of art and ornament has been successful as showing its perfect adaptability to this purpose. The "hours clock-case," designed and modelled by Mr. John Bell, is a good example; it is an artist-like work of much fancy, and is a great improvement upon the worn-out commonplaces which the constant demand for such works abroad has occasioned; it deserves notice as a work of art, but is

wanting in the symmetrical and architectural arrangement necessary to bring it properly into the province of the ornamentist. The repetitions of Mr. Bell's graceful statuette of Eve, Mr. Cheverton's reduction of Theseus, and of some mediæval examples of silver work, show the perfect applicability of the process. By this art also, in other hands, the shield of Æneas, designed by the late Mr. W. Pitts, a work of great merit, and the still more excellent work of Flaxman, the shield of Achilles, have been presented in metal, and every one must admire the beauty of relief, the richness of composition, and the classic feeling they exhibit; it is equally a subject of regret that they were never completed as works in metal by the hands of these artists themselves. Had they worked on the metal by the embossing process, which has been before enlarged upon, there is no doubt that the transference of the art from one material to another, from clay and plaster to metal, would have had a much fuller adaptation than mere repetition permits of, and would have placed these shields, as works in the precious metals, on a rank with the noblest labours of past ages.

The beautiful art-workmanship, elegant forms, and the ornamental treatments of metal in the small chalices and dagger-handles exhibited by Marrel Brothers, should be alluded to, as well as the execution of the cup by Le Brun, exhibited by Eck and Durand, since the art employed upon them is of the true character for such works; but it is not necessary to lengthen the Report by specially adverting to many other works which, while they contain much individual merit as efforts of skill, or even separately considered as efforts of art, are not consonant with the view herein taken of such labours; at the same time it must be remembered that many of the foregoing remarks are intended to apply to the views adopted in treating such works as testimonials, racing-cups, &c., not to disparage the ability of the many talented and skilful artists who have laboured upon them, rather indeed to show that what is often expended on mere material ought to be apportioned to the labours of the artist, and that by the means employed to work out their inventions they are overlaid with littlenesses and spoilt in production. Indeed, in England, the general impression resulting from an examination of the works in the precious metals would be, that the endeavour of the manufacturer was to give the greatest quantity of metal with the smallest amount of art, which is not so observable on the foreign side; the view intended to be promoted in this Report, is that art gives value to the metal, not the metal to art. A remarkable contrast in some respects to our own goldsmiths' work is seen in the collection sent by the Honourable East India Company; herein the least possible amount of metal is so treated by delicate hand-labour, by exquisite pierced work, enamellings, and inlays, combined with such a thorough consideration of the treatment of surface by hulk-work, &c., as to give the greatest amount of skilled workmanship with the smallest quantity of the material; and even in their commoner works (inlays and incrustations of silver on iron) there is such a due consideration in the first place of beauty of form, and such varied and beautiful ornamental arrangements of the details, that they well deserve the consideration of the ornamentist.

The Eastern nations largely practise the art of inlaying both in metal and in other materials, and their weapons of war are decorated with inlaid work, and with delicate chasings of the most fanciful and varied character; this is seen in

the works of that class exhibited by the Company ; they abound with ornamental inlays, &c., often extremely elegant, and always designed in strict accordance with true principles. Thus, the ivory inlays of gun-stocks, given in figs. 1, 2, 3, and 4 of plate 2, have all the elegance of the Renaissance, and the flowers adapted from nature, and traceable even to their originals, are yet perfectly conventionalized, flat, and symmetrically arranged—indeed, the proper *ornamental* treatment of flowers (the search after what is beautiful and *characteristic* in their form and colour, and not the *imitation of them*) is always attended to in Indian ornament, as a reference to the floral forms in each of the three coloured plates will prove. Almost all the arms exhibited are more or less ornamented, containing a store of suggestions most valuable to the manufacturer, and a rich mine of study to the ornamentist : among other qualities these works display is the tasteful distribution of the ornament, the sense of just quantity ; it is rarely that a border contains too much or too little ornamental form, that a diaper is too crowded or too vacant, too large or too small ; a reference to the inlays of plate 2, or to the textile fabrics in plate 1, equally illustrates this truth. Nor is this excellent art applied only to costly goods ; the same just principles are evident in the cheapest, and the lacquer workboxes (of which a specimen is shown in figs. 2 and 3 of plate 3), a manufacture of the cheapest kind, show the taste and skill of the Indian workmen equally with the more costly enamelling of the dagger-case (fig. 1) on the same plate. The inlays of silver in iron, for various domestic and personal utensils, such as hookahs, flasks, bottles, tazzas, &c., are not only simple, beautiful, and correct in their appreciation of quantity, but strictly ornamental, and abounding in suggestions of great value to those who will attentively study them : a single specimen, the inlay of a hookah, is given in fig. 5 of plate 2 : the same principles, applied to a great variety of forms, are exhibited in many works in the Indian Court. There can be no doubt of the superior workmanship of some of the best European inlayers, but in much of the ornament, and in all the true principles for its application, they had been forestalled by the natives of our Indian possessions, and by other Eastern workmen. The inlaid and incrustated arms of M. le Page Moutier (France, No. 1364), and M. Zuloaga, of Madrid (Spain, No. 264A), are beautiful specimens of ornament and workmanship, while M. Falloise, of Liège (Belgium, No. 384), and M. Roucou (France, No. 1689), are successful exhibitors of inlaid work applied to other ornamental purposes. These inlays and incrustations are a means of most agreeably diversifying surface with ornamental tracery and beautiful lines without interfering with the general forms of objects, and deserve more attention than has been given them by our artists.

Works in plated metal have been little alluded to in this part of the Report, but it is to be remembered the object is rather to remark on design and style generally, and that the rarer efforts in the richer material will always set the taste in the imitative productions. The art applied to gold and silver in its turn descends to plated wares and manufactures in the baser metals ; indeed it has rather been the object to show how completely a false view of art tends to assimilate the costly with the cheap ; and it is not too much to say, that in many respects the exhibitions of the Sheffield and Birmingham manufacturers vie with the labours of the gold and silversmiths, whilst in so far as they sometimes recur to

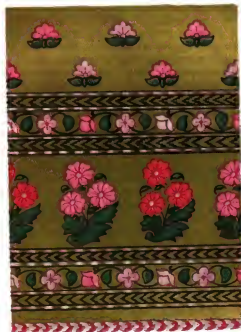


Fig. 2.



Fig. 3

FIG. 5

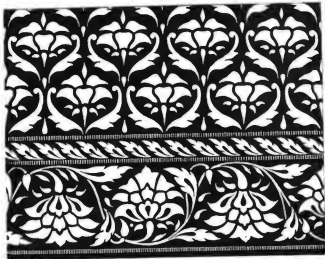


FIG. 6



FIG. 7

DA. & SON LITHO TO THE QUEEN



FIG. 8



FIG. 9

Fig. 1



Fig. 2.



Fig. 3

Fig. 4

the purer examples of past ages they are occasionally in the better taste of a better instructed age.

BOOKBINDING.

The concluding subject of this section has reference to bookbinding and the "design" applied to that branch of industry. In the Exhibition there is not a very large display under this head; but a few remarks are necessary to counteract a direction of such labours apparent even there, and much more largely seen in the general works of the time. This consists in overlooking the only true intent of the art—the appropriate protection of literary works—in order to make it a vehicle of such gaudy ornamentation and decorative display as shall serve to attract to their contents, the outside garb being a presumed measure of the inner excellence, a practice not more degrading to art than it really is to literature. Such attempts induce the use of crude and harsh colours, and lead to excess in gilding, to heavy and coarse imitations of carved work in leather, gutta serena, and even less durable materials; to perspectives and pictures on covers, to improper and inconsistent applications of metal work, and numerous other objectional practices, which, as they do not tend to utility, and are opposed to the true spirit of the binder's labours, must be avoided if the art is to attain to the simple excellence of the medievalists or to the chaste richness of the binders of the sixteenth century. It is no doubt admissible, nay desirable, that the outside decoration of a book should have some reference in its ornament to the inside contents; but still the details chosen should be amenable to ornamental treatment, should not be mere conceits, and, as has been so often reiterated, should not be mere reproductions of the ornament proper for a totally different material. Thus a painter's palette, with its range of tints prepared for study, let into the cover, can hardly be supposed the appropriate binding for a work on colour, apart from the impossibility of any symmetrical arrangement of the object itself, or of the tints upon it, for its newly adopted purpose. Neither is the perspective delineation of the apse of a cathedral a proper ornamentation for the cover of a "Church Service," any more than the host of treatments in the same direction, consisting of the fronts of cathedrals, oriel and rose windows, and stone tracery of many kinds, so often adopted for such purposes. In all tooled work and block impressions, bookbinding requires flatness of treatment as one of its first principles; interiors of churches, perspectives of tunnels, and even figures, pictorially used, are quite out of place. Heraldry and heraldic devices should be displayed flat, and even strap-work, or mere combinations of lines, should not be arranged so as to give the appearance of projection, any more than coloured materials or mosaics should give the appearance of relief, although the fine old Grolier bindings and other works of the *Renaissance* period sometimes offend against this rule. Another class of errors arise from mere imitation of details without full consideration of their intent and use. Thus, formerly, when the heavy Church Services were really bound in boards and richly ornamented, hinges were a necessary appendage, as well as bosses, by their projection beyond the surface to protect any delicate carving, rich tooling, or rare metal work inlaid into the cover; and, at present, in books of constant use, of large size, which require great strength, and come under the same conditions, the use of these appendages is desirable and appropriate. But that which is proper for a copy of the Scriptures or a Church

Service, for the lectern, is hardly suitable for a book for the pocket; yet these miniature works are *ornamented* with hinges and bosses, sometimes really in metal, and sometimes only imitated as tooled work on the surface of the leather. Even in some works, where their introduction is appropriate, their intention is at times overlooked or disregarded; thus in a choice metallic binding of a book of "Hours," by Madame Gruel, the figure of the Virgin Mary in the centre, whilst it has a higher relief than is suitable for a book-cover, projects moreover beyond the impost of the decorative bosses at the corners of the cover, which ought to serve as its protection.

The "designs" for bookbinding are principally those exhibited on the English side by Mr. D. Wyatt and by Luke Limner (Mr. B. Leighton); the works of the former gentleman, whilst they are rich and decorative, and on just principles as to flatness, are somewhat overcrowded and a little deficient in simplicity, which is rarely the case in the best works of the binders of the sixteenth century. The works of the last-named exhibitor may be better judged of by the bindings from his designs in Class XVII.; while they evidence much fancy and invention, they show a strong tendency to the picturesque, and are at times wormy and meagre in style.

Among the works exhibited may be mentioned, for good design, the bindings by M. P. M. Lortie (France, No. 1652), "L'Orloge des Princes," decorated with a diaper of fleur-de-lys on a dark ground, and a "Catholicon," although this latter is rather deficient in the proportion of its margins. The works of J. Simier (France, No. 693), and J. E. Niedrée (France, No. 665), have also merit, although it consists rather in adopting the style and labour of the past than in any peculiar novelty. This is more or less the case on the English side also, the best works being imitative of old German, French, or mediæval bindings. "The Illuminated Book of the Middle Ages," as bound by J. Wright (Class XVII., No. 139), has much merit, although wanting in a nice adaptation of the ornament to the corners. "The Glossary of Ecclesiastical Ornament" is also good, although the whole surface is too generally covered, and the margins too narrow, for the size of the diaper. The cover of "Thomson's Seasons," by Leighton, is one of the best designs of Luke Limner, and the washable enamel binding, in variegated colours, by J. S. Evans, has merit in its application of colour if not in novelty of design. Messrs. De la Rue, in works of actual bookbinding, as well as in much that is allied to this branch of industry, exhibit some specimens of good design, the ornament being composed of combinations of leaflets symmetrically arranged on flowing lines of stems, showing how a principle duly carried out is sure to result in giving a novel and distinctive character to design. There is a harmonious unity about these works, but they are a little frigid and inclined to poverty, which does not, however, necessarily belong to the style adopted. Some fancy papers, exhibited by this firm, are greatly to be praised; the ornament (in various styles) is most agreeably distributed, the forms flowing and elegant, and richness attained without guddiness. Some of these patterns would work well in silk or poplin, or even be suitable for printed fabrics; and it is in this manner that the design of one manufacturer, properly understood, may apply to another, where there are many qualities common to both, and no principle infringed in such adoption.

DIV. 4.—*Garment Fabrics.*

Perhaps there is no subject which comes under review in this Report of more importance than the consideration of design as applied to garment fabrics, since the amount of skill and labour engaged in their production forms so large a part of the industry of the world. Moreover the design applied to apparel must exercise a great influence over the general taste of the public, and persons who have been accustomed to consider gaudy, florid, and large ornament suitable for articles of clothing, will hardly be capable of judging correctly of what is true, beautiful, and appropriate, in the ornament of the domestic utensils and furniture of their dwellings. The great sources of error in designing for garment fabrics are over-ornamentation, and attracting undue attention to the ornament—which may arise from many causes; thus from the violence of contrast either of light and dark or of colour, from overcharging the colour, or from the ornament being too large for the fabric. All these causes, however, are modified by the material. Thus muslins and *barèges* will bear more pronounced contrasts than the more solid or more absorbent textures of *jacquonet* muslins or *de-laines*. Silks and *de-laines*, again will bear greater fulness of colour than the drier surface of cotton; while woven patterns in silk, formed by *tabby* and *satin* in a self colour, will bear much larger figures than are applicable to either woven patterns in varied colours, or the same printed on cottons or silks. Thus, the pattern inserted (G. F., fig. 1)—half the size of the original—is from a printed *barège*, and will



Fig. 1.

give the largest scale of pattern which appears suitable for the open texture of this material; it would, however, even in the reduced size of the woodcut, be far too large for a Swiss cambric, although it might be even larger than the original size of the pattern on a self-coloured figured silk. These observations will show the necessity of the designer carefully attending to texture, lustre, &c., in preparing his design, and illustrate the difficulty of adopting without adapting the ornament of one fabric to the decoration of another. The flowing lines, agreeable distribution, and flat treatment of the details will illustrate other points in these remarks. See also the pattern of a *de-laine* (G. F., fig. 2), and of a muslin

(G. F., fig. 4). Though the relative scale of the pattern, however, is a most important consideration, it is difficult, even after the above considerations, to arrive at any absolute rule on the subject, since the person and the stature of the wearer of a garment must have some weight in determining the suitable size of the pattern. Generally speaking, however, ornament for such fabrics should consist of small, rather than of large forms—should be treated flatly, and without light and shade—and inclined to subdued contrasts of colour, and of light and dark. A geometrical rather than a dispersed* arrangement of the forms moreover would be found the most agreeable to the eye, and the most consistent with sound principles, some of the best patterns being formed by diapering sprigs, leaves, flowers, or often even simple geometrical forms, regularly over the ground. That such patterns are essentially in good taste is shown by their constant reproduction for the more cultivated class of customers; whilst the sprawling trails, and coarse imitative treatments brought out from year to year as the novelties of the season, pass away and are forgotten, or are thrust cheaply on the market at a low cost, to catch persons whose taste is regulated by their pockets, rather than by their cultivated senses. To see the above principles carried out fully and completely, it is necessary to call attention to the garment fabrics exhibited by the East India Company: these are almost wholly designed on the principles here presumed to be just ones; the ornament is always flat and without shadow; natural flowers are never used imitatively, or perspective, but are conventionalized by being displayed flat and according to a symmetrical arrangement; and all other objects, even animals and birds, when used as ornament, are reduced to their simplest flat form; when colour is added, it is usually rendered by the simple local hue, often bordered with a darker shade of the colour to give it a clearer expression; but the shades of the flower are rarely introduced; the "cloth of gold figured in the loom," (fig. 3, plate 1.), and part of an Indian scarf, (fig. 2, plate 1.), illustrate fully these remarks. The ornament is geometrically and symmetrically arranged, flat in simple tints, and bordered as above described, with darker shades of the local colour. The principle of colour adopted is a balance of the complementaries red and green, in both cases with white introduced to give points of expression, and to lead the eye to the symmetrical arrangement of the ornament: in figure 3 purple is introduced to harmonize with the gold ground, a harmony very frequently used in the rich tissues of India; in figure 2 variety has been obtained by introducing two reds, giving an interchange of a lighter tint in every other flower in the border. The borders of these scarfs are beautifully illustrative of the simple and graceful flowing lines which characterize Indian ornament: and in figure 2 we can observe the difference between the eastern and the mediæval patterns; while the same principles are acknowledged in both, the latter are often stiffer and more angular than the graceful sprigs of this border. Both these works show how much beauty may be obtained by simple means when regulated by just principles, and how perfectly unnecessary are the multiplied tints by which modern designers think to give value to their works, but which increase the difficulties of production out of all proportion to any effect resulting from them, nay often even to the absolute disadvantage of the fabric.

* By dispersed, is meant the attempt to distribute the pattern over the ground, without any apparent arrangement.

If we look at the details of the Indian patterns we shall be surprised at their extreme simplicity, and be led to wonder at their rich and satisfactory effect; it will soon be evident, however, that their beauty results entirely from adherence to the principles above described. The parts themselves are often poor, ill-drawn, and commonplace, yet from the knowledge of the designer, due attention to the just ornamentation of the fabric, and the refined delicacy evident in the selection of *quantity*, and the choice of tints, both for the ground, where gold is not used as a ground, and for the ornamental forms, the fabrics, individually, and as a whole, are a lesson to our designers and manufacturers given by those from whom we least expected it. Moreover, in the adaptation of all these qualities of design to the fabrics for which they are intended there is an entire appreciation of the effects to be produced by the texture and foldings of the tissue when in use as an article of dress, inasmuch that no draught of the design can be made in any way to show the full beauty of the manufactured article, since this is only called out by the motion and folding of the fabric itself. An expression of admiration for these manufactures must be called forth from every one who examines them, and is justly due to merits which are wholly derived from the true principles on which these goods have been ornamented, and which result from perfect consistency in the designer.

In reverting to the general question of design for garment fabrics, it may be remarked that the making up of such goods for use should have due consideration in the general direction of the pattern. Thus while, "up and down" treatments in stripes and trails are proper, the horizontal direction of pronounced forms is not to be admitted, since, crossing the person, the pattern quarrels with all the motions of the human figure, as well as with the form of the long folds in the skirts of the garment; from this reason, large and pronounced checks, however fashionable, are often in very bad taste, and interfere with the graceful arrangement of any material as drapery.

In designing for garment fabrics, it will generally be found that the simplest patterns are in the best taste. The efforts, however, both of designers and manufacturers, have been too often directed to difficulty and complication, rather than to produce the greatest effect with the least possible means. Thus we find the number of blocks used in printing any pattern, or of colours in weaving, or the number of cards required to produce a certain design, dwelt upon, rather than the excellence of the design itself, and gaudiness and ugliness are estimated, if expensive and troublesome in production, rather than beautiful simplicity at small cost. As simplicity is one of the first constituents of beauty, it will often happen that simple patterns are far the most beautiful, and that one printing, or weaving in one colour, is in good taste, while every multiplied difficulty becomes further removed from it. It has before been said, that calling undue attention to the ornament is a great error in designing for garment fabrics: there needs, in the larger masses of the dress, a sense of what a painter calls *breadth* or repose, which is only attainable by great simplicity, by flat or diapered treatments of small forms, by uncontrasted light and dark, and delicate tints of colour: those difficult patterns of many parts are too apt to offend against the above requirements, and to cause the figure to stare upon the ground and attract attention to itself, to the destruction of the true decoration of such fabrics.

In examining the designs for garment fabrics, both British and Foreign—many of them of great merit—two things immediately strike the observer, namely, that while there is great evidence of the interchange of ideas between European designers and manufacturers (the same patterns or modifications of them being seen on both sides of the Building), it is impossible to fix on any general principle or principles that have circumscribed the efforts or regulated the taste of European designers as a body, or of any one of them as an individual. Thus we have the same artist exhibiting patterns consisting of natural imitations—patterns founded on symmetrical and geometrical arrangements—flat and shaded treatments—trails dispersed over the surface—or sprigs diapering the ground—minutely small or coarsely large forms—indeed showing his abilities indiscriminately without any apparent preference, in any and all styles and in manners most opposite. The case is entirely different in the Indian *fabrics* exhibited (for there are no designs), whether carpets, embroidery, or for garments; three or four leading and governing principles being prominent in all such works. These appear the result of science, the other of chance; and it is singular in this age of desire for novelty, that no manufacturer or designer has thought of seeking excellence or singularity, and therefore celebrity, by a rigid adherence to some fixed rules of design; seeking beauty of form, and arranging colour in compliance with their dictates, and repudiating that off-hand lawlessness which is the universal practice. In view of this general dereliction, this equal indifference to principle, it becomes desirable to examine the causes of failure, and to endeavour to impress the value of the principles which have been neglected, rather than to offer especial remarks upon the designs exhibited in this section, and since, without the insertion of many illustrations, it would be impossible to advert to the fabrics themselves, to consider designs, and ornamented fabrics, at the same time.

In the section on the precious metals it has been stated that imitation is not one of the principles of ornamental art generally, but rather one of the elementary bases of fine art, and it is now desirable to give another distinctive difference between the two which will serve still more to define their respective provinces. It is, that geometry, not necessary as a principle of art, is essentially required as the basis of ornament; thus the grouping and arrangement of art is picturesque and dissymmetrical, and consists rather of unequal quantities, except in some of the works of the early artists, which had an ornamental source. Ornament, on the contrary, has a geometrical distribution, and is subject to symmetry and correspondence of parts, and it may be truly said that it is confounding these provinces, and a departure from this true foundation on the part of the ornamentist, that has caused so much bad ornament in the various manufactures of the Exhibition, and in none more than in the textile fabrics. Thus it is not possible to cover a large space with a repetition of small ornament, without *some* symmetrical arrangement developing itself, however studiously we may endeavour to avoid it, the necessary "repents," for instance, leading to the development of the square. In such *dispersed* patterns, therefore, some amount of symmetry is produced by chance; thus the pattern (G. F., fig. 2) has not been founded on any geometrical lines, yet a four or five fold repetition would develop a regular arrangement of parts, some determinate recurrence of the berries, for instance, subject to a symmetrical law of lines. In such a case, then, the geometrical

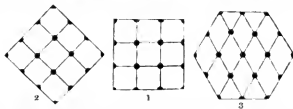
law of recurrence is arrived at adventitiously, the necessity inducing it being ungoverned by the controlling will of the designer, who therefore has neglected



Fig. 2.

all the beauty resulting from a proper choice of the regulating form. Moreover if a repetition by means of blocks or cylinders wholly without a symmetrical arrangement is an impossibility, would this not lead us to infer that symmetry is a law of nature not lightly to be broken through or disregarded, and should it not induce us to search for those geometrical figures which give the best distributions of quantities, and the arrangements most pleasing to the eye? In fact we ought not to attempt to overcome this law, but to accept it, and so regulate it as to give effect to other qualities essential to beauty, such as proportion, quantity, grace, and harmony of colour.

Having shown then that symmetry, regulated by geometrical forms, should govern the distribution of ornament, a little investigation would lead to the causes why



certain symmetrical arrangements please more than others; thus the square of equal sides and equal angles (fig. 1) is the simplest and least varied basis of distribution, the most obvious regular figure, and at the same time the most inelegant and commonplace; simply changing the direction of the lines, however, and placing the square lozenge-wise, as in fig. 2, gives a decided improvement; variety is partially joined to perfect symmetry, and a more pleasing arrangement of the forms and quantities is the result (fig. 2). Then again, if we not only change the direction of the governing lines, as in the last figure, but their angle also, as in fig. 3, and adopt the equilateral triangle and the lozenge which is its plural, we have a further variety, in the interchange between the upright and perpendicular

spaces of the quantities, and the result is a still more elegant distribution arising from the mere variation of arrangement of the same simple details. Having arrived at these facts as a starting point, viz. that symmetry is a necessary condition of repetition, and that symmetrical beauty is largely influenced by the angle or combination of angles which govern it, we may pass from the right angle, and the angle of sixty degrees which forms the equilateral triangle, to study arrangements under various other geometrical combinations, founded on other polygons and on ordinate lines from the various intersections of the sides of polygonal figures; such as hexagons, octagons, &c., of an equal number of sides; or triangles, pentagons, &c., of an unequal number, developing many beautiful symmetries and proportional arrangements.

Thus the design inserted (G. F., fig. 4); intended for a printed muslin, is founded

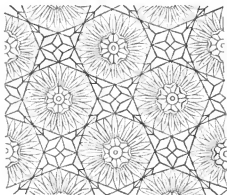


Fig. 4.

on combinations of the octagon and its ordinate lines. As combining geometrical forms with a thoroughly flat floral treatment it is very ingenious; the size of the pattern (one-half larger than the block) is very well considered for the texture of the fabric, and it will serve to illustrate the subsequent remarks on *quantity*, as the pattern covers well without being crowded, is *broad* from the absence of harsh contrasts, whilst a sufficient amount of surface is left uncovered as required by this material. The colours, much wanted for the proper expression of the pattern, were delicately rendered in pink and green, and the design had a character of much elegance for a light fabric such as muslin; it was exhibited by Florence Collins, among the works of the students of the Government School of Design.

Geometry then is the basis of symmetry, leading the way to those arrangements which best govern the general distribution of *form*. If this view of the value of geometrical arrangement is correct as to the distribution of *form*, it is still more so as to colour; some colours require definite arrangements in juxtaposition with one another for harmony, and are governed by their own laws of relative quantity, having reference to their power of mutual neutralization, as three yellow, five red, and eight blue; such arrangements being more easily obtained and regulated on a geometrical basis, than on those dispersed patterns which arise out of repetitions of the accidents of growth, or natural imitations.

The subject next in importance is *quantity*, by which, in the decoration of garment fabrics, the taste of the designer is so largely made known. The due appreciation of quantity regulates the amount of the surface of the ground to be covered by the ornament, the interspaces between diapered forms, and the size of the ornamental details, especially in relation to the geometrical bases which govern the grouping; thus in the figures 1, 2, and 3, the spots which are regulated by the ordinate lines might be larger or smaller, or, instead of them, the lozenges might be filled wholly or partially with ornament, as in the design inserted (G. F., fig. 4), the beauty and elegance of the design largely depending on the proper quantity admitted. Here the taste of the designer is exercised where rules help him no longer, but where he is guided by the considerations before mentioned as to textures of stuffs and qualities of surface, very important considerations which will be further spoken of. A study of the Indian tissues will show how well understood *quantity* as a source of excellence is in the East, their quantities being generally extremely suitable to the colour and texture of the material sought to be ornamented.

To recur to the subject of textures and surface as important considerations regulating design. It is too much the custom with designers to imagine that the patterns applicable to one quality of surface may be used indiscriminately for another, and that which is successful in one material, or by one process, must necessarily be a success in another; thus, no sooner does a pattern in silk or worsted obtain the notice of the public than it is immediately copied in printed cottons, without any regard to differences of material or modes of production, to the lustre and richness which belong to the former, and must be wanting in the latter. In adopting the patterns of the weaver, the progress by squares necessary to the weaving process is imitated in printing where it is neither suitable nor required; sometimes the whole texture and treatment is copied on the cylinder. As an observable instance, no sooner did alpacas make a strong impression on the public and become popular, than their low tones and broken tints were imitated largely in cotton prints, which almost changed their character from this circumstance, a low-toned surface or ground being adopted with slightly contrasting figures; they lost their own character to take up an unsuitable one. Cotton prints are capable of being easily cleansed, and the whiteness of the material is a great cause of beauty from its appealing to our sense of purity; this source of excellence is heightened rather than diminished by such a treatment of the ornament as contrasts with the general ground without covering it too much (see G. F., fig. 4); when the ground, therefore, is entirely covered, as in these imitations, this appeal to the eye is lost, and, however suitable such patterns may be for the poorer classes, they take from the true beauty of the fabric. The contrary is the case with woollens; the material does not admit either of the same easy purifying, nor has it the same native whiteness; the whole ground, therefore, may be coloured, or where its native hue is retained it must be more largely covered with the pattern. Thus fig. 2 (page 1669) is a pattern of a de-laine manufactured by Dolfus Meig and Co., and shows not only a proper flatness of treatment, but an agreeable quantity and a due amount of the surface covered by the ornament, and is therefore suitable for such goods.

The consideration of texture and surface is necessary in the application of

design to other fabrics as well as cotton, and to other means besides printing; thus colour, which has such effect on printed woollen goods, and shows with such richness and fulness in the absorbent material of de-laines and flannels, where it may be used broken over nearly the whole surface, is apt to destroy more valuable qualities when applied in varied tints to the decoration of silk, and should be used more sparingly on this material either in woven or printed patterns, leaving large spaces of the ground untouched, so much of the true beauty of silk residing in its lustrousness and the textural beauty of its surface. Of course this remark does not refer to self-coloured silks or to figured brocades in a self-colour, where the greatest brilliancy of colour does not interfere with the textural beauty, but only to weaving or printing patterns, consisting of many colours, too largely over the surface; the fact is, that a variety of colours tends to vulgarize both cotton, woollen, and silk fabrics, and, although least objectionable in woollen goods, they want an attention to laws of harmony which either has not been given them, or is not easily attainable by those hues which chemistry has placed at the command of the manufacturer as comprising durability among their other qualities.

The proper treatment of texture has other considerations as respects the ornamentation of garment fabrics which may find a place here, although a little irrelevant to the present matter; graceful and elegant foldings are very important in all goods intended for personal wear, and many of the most beautiful qualities of materials are brought out by the interchange of light and reflection playing over their surface on the motion of the wearer; it is important, therefore, that no mode of decoration should be adopted to destroy this quality, even irrespective of the sacrifice of proper utility which takes place in all works so overcharged with decoration or stiff from embroidery as to impede ease of movement and freedom of action in the wearer: the full lustre of silk more especially is dependent upon the folding, and every fabric is more or less influenced by the same cause. When gold or silver threads are introduced in the weaving, stiffness must result from it and the skill of the designer should be so exercised as to give the greatest effect from the least possible use of such materials. This has been particularly understood in the Indian tissues, which exhibit the best effects under folding in a remarkable degree, while the opposite error was noticeable in many costly priests' robes exhibited in the North-East Gallery, so stiffened with gold and covered with raised embroidery that the wearer must be encased in them as in a suit of armour; the whole were not only vulgarized by excess, but were perfectly unsuited for use, and for the best display of those ornamental qualities sought for. The priests' dresses exhibited in the Mediæval collection had not this error; they were soft and flexible as the tissues of India, yet rich withal and fully decorated, suitable for use, and adapted to give the best effect in that use.

The restrained use of means has often been before adverted to, nor is it unnecessary to recur to it in this section also; under the old and simple methods of cotton printing, when the resources were few and the means limited, the style was in some respects better than at present obtains. Thus block-printing by hand required flat forms and flat tints diapered regularly over the surface, and some simple flower or leaf so used had a pleasing and just effect, of which Peel's well-known parsley-leaf may serve as an instance. It will at once be seen that these qualities are herein advocated as *principles*, to be filled up and enriched by

more modern resources, yet as ascertained truths not to be departed from. In the place, however, of the former limited means, printing from metal cylinders has put at the command of the designer all those powers of more perfect imitation enjoyed by the engraver, and, instead of using them as they should be used, consistently with the requirements of manufacture and the principles of ornamental art, they are wasted on the *imitation* of flowers, foliage, and accidents of growth, quite out of ornamental character and opposed to just principles.

Having thus remarked upon the principal excellences and defects of design in this section, it is felt that the difficulties before stated, arising from the varied principles adopted by one and the same manufacturer, the large number of the works exhibited, and the impossibility of referring to any particular work alluded to, almost entirely preclude any comment upon individual works. Generally, however, it may be stated that there is less dereliction from true ornamental art in woven than in printed goods, the powers of the weaving process being more limited than those of the printing process, so that varied tints and complicated forms fortunately present greater difficulties in production in the former than in the latter case. Thus whilst the skill of the designer, and, irrespective of principles, the taste of the printed silks of F. Choqueel must be admired, a comparison with woven silks of much simpler pattern would certainly result in the favour of weaving. Of this some of the silks exhibited by Campbell and Co. are examples, as well as the Irish poplins of Reynolds and Co., and Atkinson and Co. In these latter goods there is evidence of much taste, and a greater adherence to the principles herein laid down than in almost any other fabrics except the Indian. The mixed materials of Bradford and Huddersfield, and some of those of the same kind exhibited in the Zollverein by Messrs. Rurmann and Co. are also very satisfactory where those manufactures are not too attemptive; they bear the addition of crude colours ill, and the low tone and quiet contrast of such goods are greatly in their favour. Silk, as has been before stated, is so rich a material in itself, that colour is hardly needed, and where used it should be with great caution; the silk which forms the pattern on woven *mixed* fabrics is in itself a bright contrast to the more absorbent woollen ground, and should not be forced into opposition by bright colour; and in all cases the chance of error is diminished by ab-
 -staining from colour in pattern rather than the contrary: that crude colour is most dangerous in silk goods is shown in the very feeling that prompts to moderate it in *chigné* silk, wherein the pattern is blurred and made more undefined by the process of dyeing to get rid of the crudeness that must be caused by printing in colour on the finished material, and which would almost reduce silk to the grade of glazed cotton or chintz.

SHAWLS

In the section of garment fabrics, design as applied to shawls has been reserved for a separate head; not so much from the importance of the manufacture, although even for this reason it would call for careful consideration, as that it leads to the examination of the principles on which these fabrics were decorated in the countries from which this article of dress has been derived to us.

The exhibited "designs" come first under notice: these are almost exclusively by French designers. The beauty, excellence, and costliness of the shawls im-

ported into Europe from the East have united the Cashmere patterns so intimately with these fabrics in the public mind, that it has become almost a fixed idea connected with them, and it is consequently thought indispensable to the manufacture that eastern forms and eastern treatments should be applied to these goods. Thus for a long time such works were but mere imitations, and the invention of the artist was less taxed than the laborious skill of the copyist. It is due, however, to the French designers to say, that they have of late made earnest study of the works from Cashmere and Persia, not with an intent to continue mere imitators, but to obtain the principles on which the eastern artist designed; and among those who have studied the Indian mode of ornamentation, the Messrs. Berrus (France, No. 55) must be spoken of as having greatly distinguished themselves where many are competitors.

There is nothing more difficult than to disabuse the world of a rooted error, and as the multitude, who rarely understand the true cause of excellence, have adopted the idea that the form called the *Indian pine* is the distinguishing characteristic of Cashmere patterns, this form is supposed to be necessary to the sale of shawls of this fabric, and is therefore the prominent or leading feature in all the European imitations and repetitions of these goods. But there are principles of excellence in the designs from India and the East that are the real causes of their beauty apart from any leading form, and, unless these are understood and practised, the forms alone will help but little towards the rich effects so constantly found in those works.

The Indian pine, moreover, is not present in all Cashmere shawls; in some it is either greatly suppressed or entirely absent. Whatever may have been the cause of its introduction there, whether as a sacred or national symbol, or as used only for the supposed beauty of its curves, its constant repetition in works intended for European wearers is, to say the least of it, a cause of great monotony, and implies a want of invention on the part of the designer, whose skill should supply some novel application of ornament to such fabrics to wean the public from this stock idea on the subject. But in doing this care should be taken to keep in mind those *principles* which are the true cause of the beauty of the Indian fabrics, comprising their treatment of form, treatment of colour, beauty of line, and due consideration of the material. The treatment of form is one of the essential excellences of the Cashmere designs. The objects used in ornamental decoration are always, for woven fabrics, treated quite flatly, as is the case, indeed, in all the Eastern and Indian works, whether these consist of ornamental forms having no apparent relation to natural objects, of flowers, foliage, or even of birds or animals. There is hardly any instance in which this rule has been overlooked. Moreover, excepting in the ground, large masses are rarely introduced, but large leading forms (as the Indian pine, before spoken of) are filled in with a minute diaper of smaller forms, mostly floral, and the beauty is enhanced by the graceful curves and elegant flow of these leading lines. The colours also are subject to a general rule; they consist of simple flat tints without shading, each flower, or petal, where flowers are used, each leaf in foliage, being rendered by one tint. In the best Cashmere shawls these inner diapering forms are very minute, and thus a broken texture of colour is given to the surface-ornamented. The tints, where in large masses, as in some of the embroidered

ornament, have rather a tendency to secondaries; thus purple, green, and gold prevail, and the red is inclined towards the colour of the pigment called Indian red, or in some cases to pink, which is a diluted crimson (a red with blue in it): thus the general hue has rather the direction of coolness; this is particularly seen in the carpets also, both Indian and Persian, as has been before remarked. In the Cashmere woven shawls, if pure tints are used, which may be the case, these tints become broken by the mixture of colour produced by the threads of other tints coming to the surface in them in the process of weaving, thus neutralizing their force and producing the same negative tendency; invariably flat forms without perspective or imitative rendering, flat tints without shading, and single hues of the same colour, are the principles of the designer. The due consideration as well of the material as of the use to which the fabric is to be applied is evident both from the nature of the ornament, which never draws peculiar attention to itself, and from the texture, since, notwithstanding the use even of metallic threads in the ornamental design, the Indian fabrics seem never to lose the property of flowing in beautiful folds, and adapting themselves to every motion of the wearer, an excellence not so constantly present in the European manufactures. Now the French designers, to whom it seems clear that manufacturers are almost wholly indebted for their designs, although they have made much study of principles, seem either to have overlooked some, or to have willingly ignored them, either in deference to the ruling idea entertained by the public, or in order to obtain novelty; but novelty should never be sought at a sacrifice of truth. Let the designer throw away, if he pleases, the Indian forms—the Indian pine form, perhaps, the sooner the better, since it never had any symbolical significance with us, and it has long ceased to have beauty of line, tormented as it is into every possible variation from the normal form—and avoiding mere imitations endeavour after a treatment in harmony with European taste and feelings.

Thus, for instance, geometrical leading forms are sometimes used in the Cashmere shawls, and such treatment might be most successful in the hands of European artists, considering the varied and complicated combinations of flat forms open to their choice. The Byzantine tracery, guillochés, or even the graceful forms of the Renaissance, if perfect flatness were preserved, might be diapered with colour in the Indian manner; but the tide seems to have set in quite the contrary direction,—the leading forms of the Eastern patterns are kept, the just principles are disregarded: the Indian pine, exaggerated often to extreme caricature, is applied not merely to shawls but to other goods; the diaper, moreover, instead of being flat, is composed of flowers often the size of nature, imitatively and perspectively drawn, and sometimes most elaborately shaded. Thus simplicity is lost—the principle of flatness is totally disregarded—the colour not being in flat tints, and the broken *texture* of surface entirely done away with; the result has a certain showy beauty, but it is meretricious and unsound; it may be the novelty of a season, but it is built on a false foundation and will never last.

There is a circumstance connected with floral ornament which hardly seems to have had proper consideration; it deserves, however, some attention. Many of the flowers used by us as ornament are not in a state of nature, but have already been subjected to another art, the art of the horticulturist, subjected by him to a

process of cultivation which unnaturally stimulates the growth of the parts, and by means of which, the stamens being converted into petals, the flower becomes doubled and rendered artificial—more beautiful, perhaps, as a flower, but less tractable as ornament, and far less simple, far less fitted for that flat display which is required by some fabrics. By these means the five-petalled rose, the five-petalled pink, &c., become a bunch of petals; and if we would see how entirely some flowers are thus rendered artificial, the dahlia may be instanced as an example: in its simple state it has a single border of petals with a central disk,—by cultivation it is a cluster of petals, so regularly disposed as hardly to be distinguished from a rosette of ribbons made up by the milliner. Flowers in this state are already conventionalized by another art ere the designer takes them in hand, and the result is analogous to the case of the artist who copies the actions and passions of the stage instead of seeking them in their simple reality in common life. Moreover, flowers in a natural state have simple and clear characteristics which they often lose in cultivation, and it is the difficulty of duly expressing them, as artificially changed by cultivation, that seems in some degree to have led to the false manner of treating them in the ornamentation of woven or printed fabrics.

To return to the consideration of the fabrics themselves. The new mode of varying the Indian treatment above described is not so prevalent among the “designs” as it is in the fabrics exhibited, only one exhibitor of designs for shawls showing example of this extreme departure from the true style in his works. The *relaxation* of just principles is, however, seen, even in those which purport to be simply imitations of Cashmere designs; it is shown in the introduction of small landscapes on the spaces of the ground between the large leading forms; in representing in the pattern borders of ornament quilled or gathered in the manner of a fringe; and in the spaces filled up with small diaperings being imitative of foliage, palm-trees, &c., instead of being merely flat, graceful, and flowing ornamental forms. So far from endeavouring to suppress novelty, it is most desirable to encourage it as far as possible, since true novelty is not an extreme characteristic of the present time, but it must be sought by other means than those reprobated; the designer must not suppose that by exaggerating a secondary characteristic of style into undue importance, and adding new materials entirely out of harmony with it, anything really beautiful and new will be likely to result.

In the shawls exhibited this new manner is seen to be very widely spread. The greater number of those on the foreign side, both printed and woven, are thus ornamented, and Norwich and Paisley are following in the same track. One French house exhibits two woven shawls in juxtaposition, which may serve to compare the two systems. The one is an imitation Cashmere shawl, consisting of straps or bands filled in with gracefully-curved ornamental forms, powdered over with colour in the usual manner, the Indian pine being slightly visible only in the border. The other design is in the new manner; it displays very great ability and cleverness, and is most skilfully manufactured. In it the Indian pine form, exaggerated in all its peculiarities, is filled in with imitative flowers, the size of nature, naturally drawn and shaded, with such minute imitation that even insects have been depicted on their surface. The variegation of some

flowers, as tulips and asters, and the shading of others, as roses, &c., is substituted for the diapering of colour which is characteristic of the style; simplicity of tint is therefore lost, and flatness wholly abandoned; great pains and labour have evidently been bestowed on the design, yet the result contrasts unfavourably with the neighbouring Cashmere pattern, the negative colour of this last being much more satisfactory than the hot unpleasant hue of the former, arising partly from the shades containing more colour than the local hue of the flower, instead of being more negative, and more especially from the impossibility of introducing the contrasting and harmonizing tints exactly where necessary, which can so easily be done by the simpler methods of India. It is sincerely to be hoped that this false manner will be abandoned; that when imitations are intended they will be in a pure style, and when novelty is sought for it will not be attempted by thus outraging true principles.

RIBBONS.

In examining design applied to ribbons it is necessary to have especial regard to their use, and the purpose which they are intended to fulfil; for although many of the principles which have been laid down as regulating the decoration of garment fabrics are equally applicable to them, these principles are modified by the place which ribbons hold, largely partaking, as they do, of the nature of ornaments added to the other portions of the dress.

It may be said that, when the dress itself has much pattern, ribbons, which serve as bands marking the leading lines, or as borders, should be plain in colour and without much enrichment; their office is contrast, and either simple colours or stripes in that case are most desirable; but when the garments themselves are plain and unfigured, or figured without strong oppositions of light and dark or colour, then the ribbon may become a true contrast by its ornamentation, and require marked forms and colours to give that expression which is so requisite. When regulated by good taste, ribbons, beside giving effect to form by their contrasts, serve another important purpose, by being the means of introducing brilliant portions of pure colour complementary to the general masses of the dress, thereby, when the pervading tone of the dress is negative, giving that brilliancy and heightening which, when judicious, is a great means of enhancing its effect, and giving richness without gaudiness. This use of ribbons points out their proper ornamentation, which should be in simple forms, permitting the introduction of pure tints; these require a geometrical arrangement to give them adequate force and expression, and for this purpose the patterns of the Indian tissues offer most valuable suggestions to the ornamentist; even the introduction of gold and silver may be taken advantage of as a very suitable enrichment for these ornamenting fabrics. It is to be regretted that the great prevalence of natural floral treatments as the decoration of garment fabrics has caused the adoption of the same style in ribbons, where it is more peculiarly out of place, and that the rarest efforts of the designer and the greatest manufacturing achievements have been misapplied to overcome the difficulties this treatment induces. The design of the Coventry ribbon, for instance, apart from the style adopted, is one of great merit, more successful than the best foreign efforts in the same direction; but while it is a rare proof of difficulties attempted and successfully overcome, it is also a proof of misapplied excellence and unsuitable ornamenta-

tion, being based on the artistic principle of imitation rather than on those proper to the ornamentist, abstract beauty of form and colour.

There is an evident tendency to gaudiness and over-decoration in the greater number of these articles exhibited, and it largely arises from the above cause. The increased width these goods are now manufactured, and the wrong direction of the decoration applied to them, have greatly altered their character, and we find landscapes, figures, portraits, and all kinds of natural imitations, applied as their ornament. It is pleasant, in the face of so much that is erroneous, to notice the just taste exhibited by one manufacturer of these fabrics; the silk ribbons of Buisson, sen. (France, No. 1125), have a character entirely their own, the ornament consisting of geometrical figures in gold-coloured silk, diapered over a plain ground of some delicate tint, or borderings of geometrical ornaments on the same principle, having an analogy to the Indian patterns without imitating them, and being very appropriate for the intended use of such fabrics.

LACE.

The concluding subject of this section of garment fabrics is lace design. Lace is assimilated to certain other classes of fabrics by its uses as well as by its peculiar qualities; thus, to worked muslins, for instance, in its general lightness, and in being usually without colour either in itself or in its ornamentation; and to ribbons as being an ornamenting fabric to other parts of dress. It is one of the peculiarities of lace that it is necessarily ornamented, since, without some pattern upon its surface, it would hardly retain its name. Its characteristics of lightness and fineness of texture should never be forgotten in its ornamentation, which should be essentially light, elegant, and flowing; all straight lines should be avoided, not only from the necessities of the manufacture, but because graceful forms are required to pervade its ornamentation. At the same time this textural lightness may lead into the opposite error, and the ornament be so flimsy as entirely to lose proper point and expression; and thus, where lace is used as a trimming, the line which it is intended to enforce or enrich be inefficiently marked from this very meagreness. The old point lace, worked with the needle, was often too heavy in character, from too equal a distribution of the masses of its ornament; it wanted less crowded spots to give value by contrast to the general surface; whereas the modern lace, from the object of the manufacturer being to cover large spaces with little work, too frequently errs in the opposite direction, and wants parts of more full enrichment to give it point and character. The border or edge, which in reality constitutes the true lace, should have the most solid and marked ornamentation, out of which should grow graceful curved forms, less marked and pronounced, gradually passing, in wide lace or in veils, &c., into diapers of sprigs or small ornamental forms over the remaining space. While the natural lines of the growth of plants may be adopted as the ornament of lace—for which they are very suitable from their elegance and variety—subjected to a symmetrical arrangement, however, in the succession of pattern, almost all imitations of flowers are to be avoided; floral forms being the rule, flowers imitated quite the exception. The petals and leaves should rarely be filled in solid, but treated with stitches of varied forms of the nature of a diaper of texture, so as to give lightness, variety, and richness at the same time.

The great excellence of the French and Belgian lace seems to consist more in the truer appreciation of beauty of line and delicacy of form, than in any very marked superiority of design over the English. In the work itself these characteristics are even more evident than in the designs, since they are most carefully and faithfully attended to and preserved. There is, moreover, a more just appreciation of *quantity* in the ornamental arrangements of the Brussels and Valenciennes laces than in our own; the patterns of Honiton lace are generally too heavy, the form rather too large and overcrowded, and the whole effect a little too solid and equal, although this partly arises from the mode of manufacture.

As compared with the important exhibition of the manufactured article, there are few "designs" for lace on the foreign side; and the best of those are more remarkable for execution than for any particular originality, viewed relatively to the beautiful fabrics themselves. On the English side there are some designs for lace curtains, and one for a lace veil, founded on Brussels patterns, by H. Heald, of Nottingham, which has merit. There are also several designs exhibited by the students of the Government School of Design, some of the most elaborate of which, by C. P. Slocombe and T. Rawlings, have been extremely well executed in Honiton lace by Mrs. Tredwin, of Exeter, and Mr. Gill, of Colyton. The designs are novel, but a little too architectural in their general arrangement, resulting in a slight degree of stiffness, and a want of that flowing ease which should characterize the ornament of the material. The female students also have some clever designs for lace. The beautiful *fabrics* exhibited will have their due share of attention from the Jury of the Class for the manufactured article. Some of the best design is to be found in the works of Groucock and Co. (Class XIX., 3), Forrest and Son (Class XIX., 45), and those already mentioned. The Nottingham lace curtains, although not to be commended for their design, show a tendency in a better direction than the Swiss worked muslins; the treatment is generally flatter, the borders better considered for quantity, and, in some of these works, a diaper over the central field has been adopted with good taste. In these goods, and in machine lace, some of the best designs are to be found in the fabrics of Heymann and Alexander (Class XIX., 25); and R. Birkin (Class XIX., 20) has one or two well-adapted designs for narrow machine lace also. On the foreign side the Belgian and French lace, from the grace and flow of the leading lines of the ornament, and the greater delicacy and refinement of the forms, together with the better appreciation of just quantity in the distribution of the parts, upholds the acknowledged superiority of their manufacture. The English lace, especially the hand-worked lace, seems rather to call attention to the labour bestowed on it as a part of the excellence; the foreign lace, even when greater labour has been employed, strikes us as rather elegant and beautiful than as laborious and costly, from the more easy and playful forms of its decoration. These qualities entirely accord with the nature of the fabric, and charm us more when, on examination, we become sensible of the curious elaboration which often accompanies them. The lace cuffs and berthes of B. Vander Kelen (Belgium, 313) include some of excellent design; and also the lace exhibited by Van Helen (Belgium, 299), B. Duhajon (Belgium, 314), and F. Audiat (France, 1545). On the whole there are fewer errors in the design for lace than prevail in most other manufactures, partly arising from its circumscribed nature. Besides the faults enumerated in the

foregoing remarks, the tendency to the natural imitation of flowers is seen in some of the Honiton lace.

Having passed in review the various sections and sub-sections into which this Report has been divided, it might, before concluding, be thought desirable to consider the best means of obviating the various faults observed and commented upon in the course of this examination: this, however, would be too large a subject, and one not necessarily within the nature of the Report itself. The public and the manufacturer, both equally interested, and whose improvement is equally necessary—for to be useful it must be mutual—are now awake to the necessity of better education in design; and the question naturally arises, whether the means adopted in the Government schools are the best possible for the proposed end, or whether it would be desirable to extend their scope, so as to make them not only schools of design, but in some degree workshops, where the specialties of design may be fully explained, and the due application of ornamental art to manufacture thoroughly exemplified and carried into practice?

This question, however, is twofold, and has reference to two classes, whose functions and qualifications are not necessarily identical—the designer and the art-workman. That the designer should be acquainted with certain of the means of production and the peculiar processes of the manufacture for which he designs can be doubted by no one, since, without a knowledge of the *general* conditions of the manufacture his art is to be employed upon, his labours would be useless. But the question is one of amount, and the consideration to be arrived at is, shall this knowledge be given in the course of his art-education? or is it best acquired when, having obtained a thorough knowledge of ornament, he turns his attention to some *special application* of his powers?

That the art-workman should know *all* the processes of the manufacture he is engaged upon is absolutely necessary; it is his starting point, as an education in the technicalities or processes of ornamental art is the starting point of the designer. What the art-workman has to add to his manufacturing knowledge is, such an amount of art as will enable him thoroughly to appreciate and perfectly to carry out the work of the designer, without which, indeed, he is imperfectly educated in his trade; while, on the contrary, the designer (not necessarily a workman) has to obtain such an insight into the processes of the workman or the machine as will enable him to fit his design to the difficulties of production. Like the artist and the ornamentist, the two classes, whilst generally distinct, sometimes merge into one another, from which cause the question has been unnecessarily obscured. The truth is, that while, in *some cases*, it would be most desirable that the designer should understand the *minute* specialties of the manufacture, in others it is nearly unnecessary: while the art-workman's province is quite apart from the imaginative, and all that *he* requires is a full acquaintance with the *technical means* of art, such as drawing, modelling, chasing, painting, &c. In these he cannot be too fully educated; but since the large mass of those who are to be instructed are of this class, it is obvious that the principles and practice of *design* need not necessarily form a part of the education in *all* schools of ornamental art.

This view of the question does not interfere with those *special* cases so often

alluded to in this Report, wherein, from the high requirements of the material, or of the object itself, the artist-designer is at the same time the artist-workman also, and embodies and produces his own conceptions by his own skilled handicraft.

The general truth seems to be, that when a designer has thoroughly mastered the technical language of art, and the general principles of design and its application, the amount of *special* knowledge sufficient for *his* purpose is speedily acquired in any branch of manufacture to which he may devote his attention; and in all cases more strict adaptation to uses, more originality, and greater aptness to mould the power of production to the best and most beautiful results, will arise rather from a full insight into the means at the manufacturer's command than from any technical education in those means.

This, however, is not the case with the art-workman; to give him proper instruction in *carving, chasing, embossing, painting, &c.*, it should go on consecutively with his learning the technical elements of art, and his perfection as a workman will be measured by his power of embodying his art-knowledge in his trade labours. The process, moreover, is a tedious one, requiring the hand to be educated as well as the eye and mind, to enable him successfully to combine art with handicraft; and it would seem, therefore, that such labours are essential parts of true schools of *ornamental art*.

Yet the several requirements enumerated are partial and local, and not to be made a part of general so much as of local education. Thus, since London and its vicinity is the seat, more or less, of *all* manufactures, and of the highest efforts of those manufactures, for this reason, and as a central normal school, it would be advantageous to embody in the course of the London head school instruction in all such matters; but they could only be partially useful in the provinces; as die-sinking and chasing, for instance, at Birmingham, chasing and embossing at Sheffield, modelling and painting in the Potteries, &c.; and it being ascertained which are the proper localities for central provincial schools, their peculiar art-handicraft should be taught therein, and the instruction obtained in the surrounding districts be of such a character as to prepare best for the higher instruction of the central provincial school. The truth is, that our schools have all been *accidentally* founded, rather than on any general, comprehensive, and well-defined principle: and before proceeding further, it is very desirable to have some well-arranged distribution of the means of instruction for the whole kingdom, laid down in accordance with local wants and local seats of manufacture, to control and regulate the whole, so that schools, when founded, should fall in with a pre-arranged and predetermined system. These remarks are made with no intention to dogmatise on the subject, which should rather be viewed practically than theoretically, and the solution be based on known results, rather than inferred from any supposititious points of view. The great public establishments of France, both of the Gobelins and at Sevres, would on this account demand especial attention and consideration, since the fabrics produced therein have attained a greater excellence, both of design and manufacture, than is seen elsewhere; and it would be desirable to gain full information as to the knowledge of art obtained by the workmen, as well as of the processes of manufacture by the designers in those celebrated manufactories. In the same view, the schools founded for the instruction of the bronzists of Paris, and in which they mostly

obtain their art-education, should have a full share of attention, both on account of the reputation gained by these works for artistical completion, as well as the great fancy and invention displayed in the Parisian bronzes. While our own Mediæval Court and the clever revivals it contains will show the influence on manufacture of an educated designer acquainted with the various processes of the manufactures for which he designs, and apparently controlling both the manufacturer and his workmen in their production, we have to learn, in the former instance, whether the workmen have any, and what amount of, education in *design*, and whether their *inventive* powers have been stimulated, or only the most perfect technical acquirements obtained; on the other, we pretty well know that the workmen have obtained but little even of the technical *language* of art, and that in invention they are entirely led by the designer.

The condition of the schools at Lyons also, and their routine of instruction, would furnish much valuable information on this subject, since, in the manufacture of silk, the relations between the art and the means of execution are most intimate and complicated. They would show whether the education of the workman in art, and in many cases the exalting him into the place of the designer, has resulted in a pure and just ornamentation of the fabric, or whether it has led to the skilful appliance of manufacturing means to the production of difficulties of execution in these fabrics, rather than to the simple and the beautiful in their ornamental decoration.

In conclusion, the Reporter may be permitted to express his sincere regret at his own shortcomings. It will be evident, on the perusal of the Report, that there are many omissions, and that important subjects have been treated with great brevity. Almost entirely deprived of counsel or assistance from his fellow Jurors, this task being nearly altogether out of their jurisdiction, and only undertaken by him after the Jury labours were concluded, he has to ask for a large share of indulgence. He trusts, however, that a proper spirit of inquiry into the sources of true excellence in ornamental art may be elicited from his brief labours, and lead to the rejection of what is meretricious and false, and to a more simple, grave, and earnest style in modern ornament.

RICHARD REDGRAVE, R.A., *Reporter*.

London, November 1851.

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- WOVEN, *SPUN, &c.*, FABRICS, SHOWN AS SPECIMENS OF PRINTING OR DYEING (CLASS XVIII.).—Tabular classification of objects in the Exhibition into which this Class is divided, xxxix, xl. List of Jurors and Associates appointed for this Class, *lx.* List of exhibitors to whom Prize Medals have been awarded, ciii, cliv.
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- consumption; high average of excellence shown in its production, 998. Observations on the printed silk handkerchiefs; originally of Eastern origin, *ib.* Still an article of considerable import, *ib.* Changes which have taken place in the relative imports, *ib.* Progressively increasing trade in this branch of the print manufactures, 998, 999. Trade carried on for some years in Germany, 999. Attempts made in France of late years to print silk handkerchiefs, *ib.*
- Excellence of the specimens of printed goods exhibited in the British Department, 999. Absence of any specimens of printed goods, the productions of Rome, *ib.* Reference to the contributions of the French printers, *ib.* Character of the French goods differs from that of the English, *ib.* Fine printed furniture from France, *ib.* Beautiful specimens of yarn-printed silks, *ib.* Interesting contributions of printed goods from Switzerland, 999, 1000. Specimens of printed goods from Russia, Prussia, Austria, and other foreign countries, prepared chiefly for their respective markets, 1000. Egyptian contribution of printed goods, curious, *ib.* Specimens of printing from Central India, *ib.* Circumstances which have guided the Jury in their decisions and awards, *ib.* General remarks on the specimens of dyed goods, *ib.* Numerous specimens of great variety and purity of colour in the British Department, *ib.* Collection of dyed goods from France, variety of merinos, 1001. Varieties of dyed yarns from Saxony, Prussia, Austria, and Russia, *ib.* Numerous specimens of dyed silk from Switzerland, *ib.* Complete assortment of dyed silks from China, as used in her manufactures, *ib.* The art of dyeing has participated in the great industrial movement of the last 25 years, *ib.* Difficulty of presenting bright and uniform colour, on fibres having different affinities, has been overcome, *ib.* Substitution of Prussian blue, with a tin mordant for indigo, with complete success, *ib.* Colours extracted from dye-woods rendered brighter and more permanent, *ib.* Preparations of tin in general use, *ib.* Great improvement in the bleaching or whitening silk fibre intended for the dye-bath, *ib.* Points of excellence upon which the awards in this Class are founded, 1st.—In printing; 2nd.—In dyeing, *ib.* List of exhibitors awarded Prize Medals in this Class for printing and printed goods, 1001–1003. Prize Medals awarded for dyeing, 1003. Application of a scientific principle in preparing various textile fabrics, by John Mercer, *ib.* Results shown in the goods exhibited by him, *ib.* The Jury would have recommended this inventor for a Council Medal if his discovery had been extensively applied in manufacture, *ib.*
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